

THE IRON AGE

THURSDAY, OCTOBER 23, 1890.

Bolt Lathe.

This lathe is built by Israel H. Johnson, Jr. & Co., of Philadelphia, and is designed especially for finishing bolts used in the construction of locomotives and machinery where the bolts are required to be turned taper to fit taper reamed holes. The lathe is a very heavy, stiff and solid machine. The driving cone has large diameters for a wide belt, thereby insuring ample power without back gearing. The spindle is of the best steel, of large diameter and is fitted in solid bronze bearings provided with suitable adjustment for taking up all

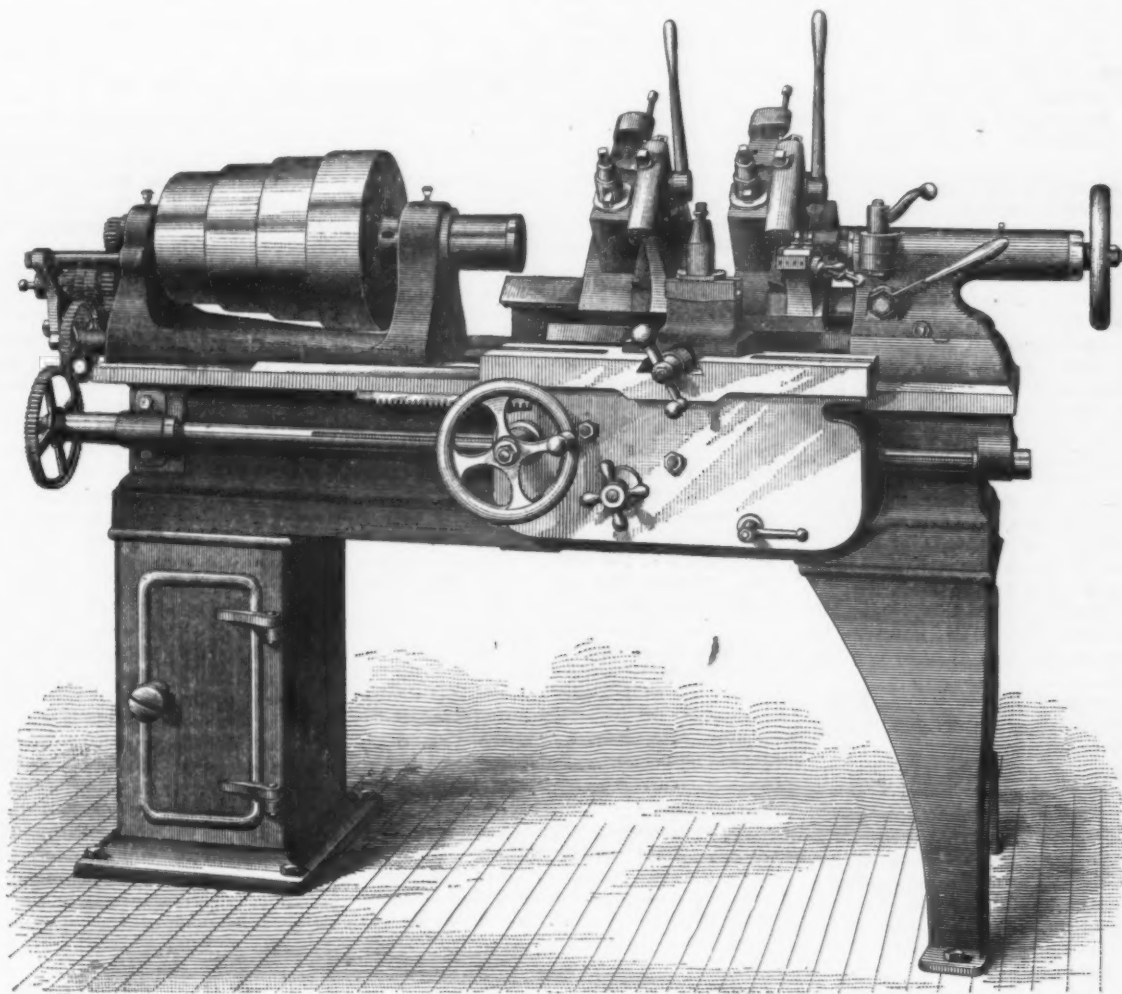
September foot up about \$7,000,000 out of a total of about \$36,000,000 to all countries.

Pike's Peak Cog Railroad.

The cog railway to the pinnacle of Pike's Peak has been completed in one year from the beginning of the work, with the labor of 1000 men. Its exact length is 46,158 feet, or 9 miles. The altitude of its initial station at Manitou is 6600 feet; at the summit it is 14,200 feet above the level of the sea, the total ascent being 7500 feet, or an average of 846 feet per

either side of the cog wheels is a heavy steam brake with corrugated surface which is operated with tremendous force. The engines are also fitted with hand brakes, and an additional device (the Le Chatelier brake) by which the cylinders act as brakes. The tank holds 700 gallons of water and is filled four times in each round trip. One engine will push two cars weighing 42,000 pounds loaded.

As it now appears, the output of iron ore from the Marquette range for 1890 will not exceed by much, if at all, the



THE JOHNSON 17-INCH BOLT LATHE.

wear and keeping the spindle in a central position. The apron is provided with a patented friction feed and reverse for the carriage. The lathe has three grades of feed without change of gears.

Two heavy, stiff and adjustable tool-rests are fitted to a bracket on the back of the lathe; one rest is for squaring the bolt under the head, and the other for squaring the bolt to length. A special rest is fitted to the spindle of the tail-stock for clamping the end of the bolt after it has been squared to length by the tool on the back. The tail-stock is furnished with side adjustment and is clamped to the bed by an eccentric, which is firm and can be quickly handled. The machine is well designed for the work.

The exports to Mexico, Central and South America and the West Indies from the port of New York during the month of

mile. The maximum grade is 25 per cent., over 22 per cent. of the line having a grade of 22½ to 25 per cent.

The famous incline railway up the Rhigi in Switzerland is dwarfed in the comparison. Several prominent railroad presidents are interested in the scheme as an attraction for tourists. The engines, three in number, each weighing 25 tons, were built by the Baldwin Company, of Philadelphia, and are of the latest and most improved pattern. There are three wheels on each side of the engines, which act as guards and to sustain weight. There are three driving cog wheels, two of which are in constant use, and the third is reserved for engineers. The propelling power is applied directly to a drum above the two rear drivers. The front drivers are moved by a walking beam running from the second driver. The brake apparatus is especially strongly built. On

output of the same range for 1889. Up to October 14 the shipments for the season aggregated 6,745,542 tons, this being 1,071,225 tons above the total of last year at the same stage in the season. By ranges the shipments have been as follows: Marquette, 2,113,641 tons; Gogebic, 2,060,812 tons; Menominee, 1,713,310 tons; Vermillion, 757,679 tons. The shipments from the different ports to date are as here given: Marquette, 1,141,558 tons; Escanaba, 2,947,111 tons; Ashland, 1,818,063 tons; Two Harbors, 757,679 tons; Gladstone, 65,220 tons; St. Ignace, 15,911 tons.

The bottom of the river at Quebec in the course of 20 years has been raised 37 feet by throwing overboard ballast from vessels arriving to export timber. The demand now is for harbor improvement, to recover lost trade.

Notes on the Cubic Compression and the Cold Flow and Crushing Strength of Iron, Steel and Other Metals.*

BY JAMES E. HOWARD, WATERTOWN ARSENAL.

The experiments upon cubic compression consisted of subjecting the metals to hydrostatic pressure while immersed in water in the bore of a strong steel cylinder, after which they were tested by tension or by compression, and the results so obtained compared with similar tests made with uncompressed bars.

Observations upon cold flow and the ultimate compressive resistance of free specimens were made with short cylinders about $2\frac{1}{2}$ diameters long, loaded axially without lateral support, increasing the stresses until a well defined ultimate resistance was reached or until the metal was greatly distorted.

In the series on cubic compression cylindrical specimens were employed, each about 5.5 inches long by 0.75 inch diameter.

The hydrostatic cylinder was 10 inches long, 6 inches exterior diameter, by 0.806 inch diameter of bore. Flatended pistons were used provided with cup shaped leather packings, which latter were reinforced by copper rings of triangular shape in cross section.

The copper occupied a place at the angle between the piston and the bore of the cylinder, and was employed as a precautionary measure against any tendency of the leather to blow out at that place.

The packings sealed well under the highest pressures reached—117,600 pounds per square inch—and after the test appeared to be in good condition. Indeed, in the absence of evidence of deterioration, what the maximum resistance of such a packing is could not be predicted.

If, in any case, the packings leaked they did so at low pressures; if, however, they sealed well at the start they so continued to the end.

It may be remarked in passing that the water in the hydrostatic cylinder displayed great compressibility—apparent when so wide a range of pressures was employed. Care was taken to use boiled water, and the air about the packings dislodged, yet the pistons would enter the cylinder and spring back again as the loads were successively applied and released, showing a highly elastic condition of the water, the elasticity, of course, being augmented in its apparent effects by the resistance of the metal of the cylinder and of the pistons. Approximately stated the compression appeared to exceed 15 per cent. of its original volume when under 100,000 pounds per square inch pressure. The most favorable time for observing the amount was when the cylinder was charged with water alone, no specimen being present, but on such occasions the cylinder was over loaded by successive interior pressures, each exceeding the elastic resistance of the metal, this being done to create a high initial resistance at the surface of the bore. Under these circumstances the exact volume of the part of the bore filled with water was not known, hence the exact determination of the compressibility of the water not obtained. Further experiments in this direction are contemplated. The water under the highest pressures did not penetrate the walls of the cylinder, at least there was no evidence of any penetration discovered, the permeability of ordinary cast iron under much lower pressure being in striking contrast to the behavior of this steel.

* From the reports of tests of metals made at the Watertown Arsenal, Mass.

In the preliminary straining of the cylinder by excessive interior pressures, in addition to the bulging of the sides along the middle part of its length, there took place a very pronounced flow of the metal in a longitudinal direction next the bore at the ends, increasing the length of the cylinder 0.015 inch. The distance the piston entered the cylinder was less than the thickness of the walls and insufficient to resist the tendency of the metal to flow from the parts directly receiving the hydrostatic pressure.

The specimens subjected to cubic compression were of wrought iron, cast (gun) iron, a mild grade of O. H. steel, drawn brass and copper, tin, lead, zinc, aluminum bronze, also pieces of white oak and white pine wood.

A pressure of 90,000 pounds per square inch was applied in each case, excepting one specimen of steel which received the higher pressure of 117,600 pounds per square inch, one cast iron specimen was loaded with 89,000 and the white pine with 84,900 pounds per square inch.

The specimens were measured before and after exposure to the hydrostatic pressure.

Either no appreciable or very slight changes in dimensions occurred, excepting the cast iron and wrought iron were smaller in places, and as the reductions did not take place uniformly the effect of the pressure was thought to have resulted in closing the grosser class of vacuities which existed, such as were formed by blow holes in the cast iron and cinder patches in the wrought iron.

Through the white pine wood the water seemed to pass so freely that there was no collapsing of the fibers as a whole, and the wood came out of the cylinder in a water soaked condition larger than when it entered. Water colored with cochineal tinted the wood throughout.

There was not this free penetration or circulation of the water through the white oak. At one end the wood was water soaked and enlarged, the greater enlargement taking place in a direction parallel to the rings of annual growth, in this respect resembling the white pine. The opposite end of the oak showed the reverse tendency, and at the middle of its length the collapsing pressure had reduced the diameter 0.092 inch parallel to the rings of growth, and 0.030 inch at right angles to the same.

An examination of the tensile and compressive tests which followed does not show that any marked difference in tensile strength resulted from the cubic compression, thus the tensile test of an uncompressed steel specimen gave 44,000 elongation and 66,000 tensile strength, against 43,000 and 64,000 for the cubic compressed sample. In the wrought iron the compressed specimen had a lower elongation but a higher tensile strength than the uncompressed sample. And so the figures ran for the other kinds of metal, the differences were such as might commonly be expected among tests of the same metal. The compressed sample of lead, however, exceeded the uncompressed about 50 per cent. in tensile strength, but as these lead samples were cast from a ladle of scrap, impurities may account for the large difference in strength.

Neither was it found that the ductility of the metal, as indicated by the elongation and contraction, was materially changed by the treatment. Under compressive tests the drawn brass and the lead each showed increased strength in the cubic compressed specimens, otherwise the differences were not remarkable. There were no duplicate specimens of wood with which to institute a comparison, but the white pine had an ultimate crushing strength of 5500 pounds per square inch, and the white oak over 8000 pounds per square inch. These are considered

good average values for the material. We are led to make the important observation from the results of these experiments, that pressure alone, unaccompanied by flow or without distortion beyond the elastic limit of the metal, does not apparently cause any change in the physical properties examined.

A distinction is here made between the effects of stresses and of strains in the metal. In a free test the strains are proportional to the stresses applied, within the elastic limit, and we are unable to conceive of certain strains existing, tensile for example, without the action of stresses, but on the other hand we may conceive of stresses on a non-compressible material without corresponding strains.

From what has been said in another article* on internal strains in metals it seems that while certain effects or changes in properties are accomplished by means of stresses, it is really the strains or the relative displacement of adjacent parts that is directly responsible for such phenomena.

Deeply buried rock furnishes an illustration of material subject to cubic compression, exceeding in intensity the strength under free test of any rock of which we have samples on the surface of the earth, and were it not that the rocks are capable of enduring enormous pressures when in a confined position we should expect to find them in a pulverized state whenever from natural convulsions they happen to reach the surface.

Under the ordinary free tests by tension or compression certain stresses—those below the elastic limit—do not cause any sensible change in physical properties. Stresses exceeding that limit ordinarily bring about a series of phenomena which culminate in rupture or disintegration of the material. Under cubic compression we have not yet reached pressures which gave evidence of such a tendency in the ultimate result as that caused when flow of the metal occurred.

Stated in other words, while there seems to be a restricted molecular orbit represented by the elastic limits of tension and compression, and that these orbits may be disturbed and thrown into new positions by loads exceeding the elastic limit, in the case of cubic compression we have not yet employed sufficiently high pressures to sensibly disturb these orbits, nor do we even know whether by such means a limit can be reached when these orbits may be interfered with. Whereas, under tension the cohesive forces tend to preserve the integrity of the metal. Under cubic compression it may be that the material substance of the specimen itself imposes resistance sufficient, without the aid of the forces of cohesion, to prevent any molecular injury. If such speculations as these are admissible we can see a rational difference between the ultimate tendency of tension stresses and cubic compression.

Additional data will be presented touching upon this branch of the subject when referring to cold flow and ultimate crushing resistance. The decided reduction in the specific gravity of hardened steel raises the query whether in this or any other instance of diminution or specific gravity cold pressure would be capable of restoring its density. Inasmuch as the crushing strength of a specimen of hardened steel reached the enormous resistance of 600,000 pounds per square inch we are compelled to admit that for want of strong enough material with which to construct the hydrostatic cylinder that the limits of our observations will remain in a restricted state. As we are considering the treatment of metals at atmospheric temperature, no comments will be made upon the effect of pressure at higher temperatures as applied in the fluid com-

* See *The Iron Age* of August 14, 1890.

pression of steel or pressure at such temperatures as are employed in the welding of metals. The specimens tested for cold flow and ultimate crushing resistance were each 2 inches by 0.798 inch diameter. They were compressed axially between flat faced buttresses, the sides being unsupported. In considering the stresses per square inch, a departure was made from the usual method of referring the stresses to the original sectional area, as commonly done in free tension and compression tests. In this case the stresses being computed according to the actual area as it existed at the time the stresses were acting. In so proceeding diameters were measured at the middle of the length of the cylinder and the corresponding area used. At the ends the diameters were smaller, due apparently to the frictional resistance between the specimen and the buttresses which prevented free flow at the end surfaces. The diameter at the middle of the length was the largest one after the flow had continued for a time, although when the loads first exceeded the elastic limit there was an enlargement in diameter. About $\frac{1}{4}$ inch from each end of the specimen exceeding the middle diameter from 0.001 inch to 0.007 inch. As the stresses were increased and additional flow took place these places of maximum diameter approached each other and finally merged into one at the middle of the length of the specimen. This peculiar behavior is attributed to the shearing tendency during flow, an imaginary cone developing at each end of the specimen, their apices facing, and down the sides the metal flowed accumulating near the bases but prevented from reaching quite there by reason of the friction at the buttresses, as before mentioned. Similar behavior has been observed in the compression of short cylinders of copper.

Ten grades of steel were experimented with in this series, ranging in carbon from 0.09 per cent. to 0.97 per cent., advancing approximately by tenths of a per cent., also a cast iron and a wrought iron were used. Under free compressive stresses the specimens began to bulge laterally, as above described, when the elastic limit was passed, and the stress per square inch increased for a time thereafter, while the shortening in length and increase in diameter continued. But while the gross load was gradually increased to the end of the test a period was reached when the stresses per square inch on the sectional area, as it existed, ceased to increase and for an interval the flow was continuous with practically no increase of stress. This period marked the ultimate compressive resistance of the metal. In the more ductile specimens, after continuous flow under a uniform stress per square inch, there followed a period of gradually increased resistance prior to visible indications of disintegration or rupture. In such cases it was thought that the influence of the rigid buttresses was felt and that lateral flow was interrupted in its freedom by frictional resistance, and that half the length of the specimen in its then reduced length marked the limit of reinforcement due the buttresses, and beyond this distance unrestricted flow might occur. The specimens were shortened amounts ranging from 0.40 to 0.76 inch, in their original length of 2 inches when this period of continuous flow was reached, and continuous flow ranging over a further movement of 0.28 to 0.67 inch among the different specimens. The wrought iron reached the period of continuous flow earliest, that is, with the least amount of compressive strain, excepting one grade of steel. The cast iron did not reach such a period, but failed by the development of oblique shearing fractures before exhibiting continuous flow. The ultimate resistance and load at continuous flow increased with the carbon of the steel, but in regard to the

time when the flow began and its duration, the results did not follow regularly with the carbon. Thus we see in the accompanying table that steel of 0.09 per cent. carbon reached the period of continuous flow under a practically constant stress when the cylinder had been compressed 0.76 inch and the flow continued during the additional interval of 0.41 inch before the stress per square inch began to increase rapidly. Steel of 0.97 per cent. C. reached the stage of continuous flow after a total compression of 0.67 inch, but the flow only continued during the further interval of 0.28 inch when oblique shearing fractures developed in the bulged sides, and intermediate grades of steel gave varying results as regards these two values. Considering the relation between the compressive elastic limit which marks the commencement of permanent flow, with the ultimate compressive resistance as illustrated in these experiments, and it is found that the ratios of the elastic limit to the compressive resistance are confined to narrow limits. For the several grades of steel the compressive elastic limit under free test ranged from 35 per cent. to 42.9 per cent., the ultimate compressive resistance of the metal. The two samples of wrought iron showed intermediate values. Excepting the mildest steel, the final result was the development of oblique shearing fractures. The mildest steel, containing 0.9 per cent. C., ruptured like the wrought iron and like a hot specimen of 0.97 per cent. C. By opening longitudinal tensile fractures the hot bar referred to was compressed while cherry red. While oblique shearing fractures predominated in the other bars, yet there were fractures which were oblique in part and in part longitudinal. The latter portions exhibited silky surfaces; the former, lustrous smooth faces. In some cases the progress of the test was interrupted and resumed after a period of rest, whereupon the steels at once renewed their flow, but with the wrought iron such a period of rest was followed by decided increase in resistance of a temporary nature, however.

When the more ductile specimens had been reduced in length to 0.80 or 0.70 inch, there was rapid increase in resistance, until the time when fractures became visible, and it was thought that the re-enforcement in strength due the frictional resistance at the buttresses was now felt throughout, and, consequently, the distance from 0.40 to 0.35 inch marked the limit of direct re-enforcement, beyond which distance from the buttresses unrestricted flow may take place, in specimens of this size. While this shortening in length is going on there is comparatively little radial flow immediately at the ends of the specimens. Circular lines were scored on the ends of a specimen of 0.57 per cent. C., and when the outside scored circle had increased in diameter from 0.76 to 0.806 inch = 6 per cent., the middle diameter of its length had increased from 0.798 to 0.993 inch = 24 per cent., and when the middle diameter had reached 1.287 inches, the end scored circle had increased only 0.06 inch = 9 per cent. At this last stage the end diameters had increased to 1.08 and 1.11 inches respectively, but this was accomplished chiefly by reason of the metal flowing out and over the original metal of the ends. In fact, from the evident manner of failure, it seems that the tests might very properly be called shearing tests, instead of crushing. The observed tendencies of the metal and an abstract consideration of the possible kinds of rupture suggest the query whether there are more than two kinds of fracture, namely tensile and shearing. It would appear that disintegration was accomplished by the direct tearing asunder of the particles or the oblique displacement of them. From what was observed in the cubic compression

series and from further facts to be mentioned this hypothesis seems tenable.

We note this feature; that under direct tensile stress metals frequently fail to display the amount of ductility which it is possible to develop by other methods of causing flow and relative displacement of adjacent parts. All the common operations of the working of iron and steel bear witness to this last mentioned feature.

We find in the series of tests under consideration evidence of the ability of the metal to elongate far in excess of what is displayed in the free tensile tests. These tests are prolific in their suggestions of other tests to inquire into the behavior of the metal when exposed to other conditions not yet experimentally investigated, as, for example, the probable behavior of a ductile metal exposed to tensile stresses, and at the same time subjected to an excessive lateral compression; each stress of sufficient magnitude to cause a certain amount of flow independent of the other.

By reference to the tabulated results, we observe the elongation of the surface metal in one specimen—steel of 0.50 C.—actually reached 95.5 per cent., while the greatest elongation of any inch section in the tensile test of this metal, not measuring the metal on the contracted section at the place of fracture, only reached 17 per cent.

A large circumferential elongation was displayed by the other specimens. The cast iron even showed 9.6 per cent. elongation. This extension of the surface metal is not, strictly speaking, analogous to elongation under tensile stress. The extent of circumference metal in the compressed specimen is increased apparently by a process of substitution, in which particles somewhat remote originally, taken in a longitudinal direction, are brought together, while under direct tensile stress the opposite kind of action is found—that is, the particles are removed from each other longitudinally.

In the last column of the table are figures taken from the tensile tests of these several grades of metal, from which it appears that the tensile stress on the fractured section at the time of fracture exceeds the ultimate compressive resistance in the case of five of the lower carbon steels, but for the higher carbon bars the stress on the section at rupture falls below the other value. The stress on the ruptured section represents the maximum tensile resistance in pounds per square inch which the metal displays, and it is remarkable that these tensile stresses should in certain cases exceed the ultimate compressive strength and in others not.

A second specimen of steel of 0.9 per cent. carbon was prepared with a concentric hole drilled through its length 0.08 inch diameter. Applying pressure the cylinder was shortened from 2 down to 0.75 inches long, without in the meantime appreciably diminishing the diameter of the drilled hole at the ends of the specimen. At the middle of its length the hole was in fact considerably enlarged in diameter. The metal now showed signs of disintegration and continuing the pressure, when the cylinder had been reduced in length to 0.40 inch, tensile and shearing fractures both were developed in the bulged surface, at this time the diameter of the drilled hole was slightly diminished.

All this seems consistent with the observations made in the cubic compression series, that we have not yet demonstrated the limit of compressive resistance when flow is prevented, nor even are we in possession of evidence to predict whether such a limit is attainable with the means at hand for making such experimental inquiry.

In this connection it will be remarked that any depression in the surfaces of the buttresses was filled by the flow of the metal of the specimen into these cavities

leaving figures in relief on the end of the specimen, but on the other hand, any cavities existing in the end surfaces of the specimen remained unclosed. The metal in the arched or dome form which formed the surfaces of the indentations in the specimen resisted any tendency toward their effacement.

Having had occasion to remark that some interesting experiments we are practically debarred from making, because the test specimens possess so high a degree of resistance that we are without other material of adequate strength to serve as straining fixtures, an experiment made with material of low resistance under ordinary pressures is of interest in this connection.

A reservoir having a diameter a little over 1 inch was in communication with the bore of a cast iron cylinder under test,

this example we have a material plastic under low pressures, showing extraordinary rigidity as regards change of form when high pressures were received.

With soft substances we may attain relatively very high pressures which would, of course, be greatly beyond what is possible with iron and steel, considering the initial states of the different classes of material.

SOUTHERN MISCELLANY.

Two of the new manufacturing towns in the lower South have recently reorganized on a stronger basis. These towns are Tallapoosa, in Georgia, and Bridgewater, in Alabama. The Tallapoosa Land, Mining and Mfg. Company have been absorbed by the newly incorporated Georgia-Alabama Investment and Development Company, who have organized

complete rolling mill plant. The entire works are to occupy a site of 20 acres. The company inaugurating this big enterprise have secured valuable mineral rights not far from town, and the ore will be sent to the furnace on gravity cars. When in full operation 3000 men will be employed at this plant, which means an influx of at least 5000 additional population for Tredegar.

The Cardiff Rolling Mill Company have been organized at Cardiff, Tenn., by M. M. Duncan, H. C. Young, C. P. Moore, and others. They have a capital stock of \$200,000, and intend manufacturing sheet iron and sheet steel, the capacity of their plant to be 1500 tons per year. Their plant will consist of 12 puddling furnaces in a building 125 by 250 feet. It will also contain a heating furnace with double train and squeezer. Another building of similar dimensions will contain three trains of sheet rolls and annealing and heating furnaces.

The plant of the Crown and Cumberland Steel Company, of Cumberland, Md., was sold at trustees' sale September 18, to Hicks & Dickey, iron and steel merchants, and R. B. Seidel, crucible manufacturer, all of Philadelphia. The plant originally cost \$100,000, and is well equipped. It will be incorporated and organized anew under the name of the Cumberland Steel Company, and will be started up at any early date.

The city of Atlanta, Ga., recently opened bids for supplying about 6000 tons of water works pipe, and there was quite a marked contrast between the bids received. In some instances there was a difference of \$6 a ton between the Northern and Southern manufacturers. The lowest bid was \$22.24 per ton, being that of the Howard-Harrison Iron Company, of Bessemer, Ala. The next lowest was \$22.95, by the Anniston Pipe Works, Anniston, Ala. Other bids, giving only the names of cities, were as follows: Philadelphia, \$25; Louisville, \$25.80; Cincinnati, \$28; Philadelphia, \$28.91, and Burlington, N. J., \$29.71. Thus, with the exception of one Philadelphia concern, which was \$2.76 higher, the Northern bidders were \$6 to \$7 a ton higher than the Bessemer company. As there were 6000 tons to be bought, the difference in the whole bid amounted to between \$36,000 and \$42,000.

The Moore Structural Ironworks Company, with a capital stock of \$150,000, have been organized at Grand Rivers, Ky., and will establish a plant at once. The Grand Rivers Company are interested in this enterprise. They are also preparing for the erection of two 60-ton charcoal iron furnaces, the contracts for which have already been placed.

A company is reported organizing at Birmingham, Ala., to establish an iron furnace at Choccolocco, Ala.

A company is organizing at Carrollton, Ga., to establish a machine shop and foundry.

Car works are to be established at Galveston, Texas, by the National Railway and Street Rolling Stock Company, of Boston, Mass., if the citizens of that place will take \$100,000 worth of the stock in a \$500,000 company that is proposed to be organized.

The Sequatchie Valley Coal and Iron Company, of Sequatchie, Tenn., are reported to be in negotiation for the establishment of a sewing machine factory at that place.

The Blue Ridge Manganese Company have been incorporated at Charleston, W. Va., by W. A. and L. A. Wilson, George O., J. E. and W. E. Clinton, to develop iron and manganese lands.

Probably the largest piece of shafting ever made in the South was recently turned out by the rolling mill department of the United States Rolling Stock Company, at Anniston, Ala. It is 25 feet in length, 7½ inches in diameter and weighs 3640 pounds. It was made for the company's Anniston works.

It is reported that a company with a capital stock of \$100,000 have been organized at Seymour, Texas, to establish an implement works.

It is stated at Bristol, Tenn., that Smith & Burdette, of Cincinnati, Ohio, are to erect and operate branch pipe works in the first named place.

The machine shops of the Baltimore and Ohio Railroad at Martinsburg, W. Va., are to be increased in capacity, and a passenger car works will probably be erected.

A branch plant of the Lehigh Valley Spring Works, of Lehigh, Pa., is to be established in South Anniston, Ala.

The Rome and Decatur Railroad Company intend erecting machine shops at Decatur, Ala., and have purchased a site for that purpose.

A mining company, consisting of H. P. Wyman, of Grand Haven, Mich.; T. Cairns, of Pineville, Ky., and F. A. Hull, of Danbury, Conn., has been formed at Highlands, N. C., to purchase and develop 40,000 acres of mineral lands in that vicinity. There are iron

Kind of metal.	Reduced length.	Concurrent compressive resistance, per square inch.	Ultimate compressive resistance, per square inch.	Maximum elongation of surface metal.	Tensile stress on ruptured section, per square inch.
	Inches.	Pounds.	Pounds.	Per cent.	Pounds.
Steel 0.09 carbon.	1.24	84,030	85,580	72.8	106,434
	0.83	85,470			
Steel 0.20 carbon.	1.31	100,120	105,520	75.6	113,704
	0.83	101,890			
Steel 0.31 carbon.	1.26	115,150	116,790	80.5	126,640
	0.95	115,560			
Steel 0.37 carbon.	1.26	121,070	121,850	72.1	134,600
	0.88	121,350			
Steel 0.51 carbon.	1.425	131,760	133,480	95.5	152,380
	0.89	131,900			
Steel 0.57 carbon.	1.245	156,630	157,100	58.8	134,880
	0.965	156,640			
Steel 0.71 carbon.	1.34	156,250	156,800	59.1	151,510
	0.89	156,640			
Steel 0.81 carbon.	1.465	194,240	196,300	54.5	158,140
	1.20	196,300			
Steel 0.89 carbon.	1.60	181,100	188,110	51.3	147,860
	0.93	183,250			
Steel 0.97 carbon.	1.33	192,550	193,090	45.6	161,910
	1.05	193,090			
Cast iron.	1.825	96,320	96,320	9.6	
Wrought iron, not annealed.*	1.545	90,630	91,500	43.2	
	1.21	90,290			
Wrought iron, annealed.* ...	1.555	91,600	93,610	51.4	
	1.18	93,610			

* These specimens came from a ruptured tensile specimen. It was desired to learn whether any decided difference existed between an annealed bar and one which had been over strained by the opposite kind of stress.

Tabulation of Results Upon Cold Flow and Crushing Strength.—Original Dimensions of Specimens, 2 Inches Long, 0.798 Inch Diameter.

through a connecting part which had an aperture $\frac{1}{8}$ inch diameter and about 2 inches long. The reservoir and the test cylinder were both charged with a mixture of beeswax and tallow in the proportion of four parts to one. Pressure was applied to the piston of the reservoir, and there was apparently transmission of the pressure through this small aperture until the pressure in the reservoir was between 30,000 and 40,000 pounds per square inch. From this time onward the increased pressure in the reservoir was not transmitted to the test cylinder, notwithstanding the pressure in the reservoir was increased to 102,610 pounds per square inch. That is to say, with a difference in pressure exceeding 60,000 pounds per square inch in the two cylinders, the wax refused to flow through the $\frac{1}{8}$ inch aperture, as in this case, on account of the yielding of the test cylinder a certain flow of the wax would have been necessary and would accompany the transmission or equalization of the pressure in the two cylinders. In

with a capital stock of \$4,500,000, and with the following well known names for their officials: Hon. B. F. Butler, of Boston, Mass., president; Hon. Logan H. Roots, of Little Rock, Ark., first vice-president; James W. Hyatt, of Norwalk, Conn., treasurer, and T. E. Major, secretary. The furnace and other industrial plants belonging to the old company are to be enlarged and many new enterprises set on foot. The former development company at Bridgewater have been absorbed by the Bridgewater Land and Improvement Company, who have a capital stock of \$5,000,000, and among the largest stockholders are such well-known New York names as Robert Bonner, A. B. Clafin, Mr. Cornell, of the Cornell Iron Works, and Mr. Delamater, of the Delamater Iron Works. The new company propose to establish some very extensive and important industries at Bridgewater.

The old town of Jacksonville, Ala., under the new name of Tredegar, starts off on a new existence this week. Contracts have just been signed for the construction of the steel plant previously mentioned in this correspondence. It is to be completed by May 1, 1892. There will be three furnaces 117 feet high, 26 feet 8 inches at base and 20 feet at the top. The stack will be 210 feet in height and 15 feet in diameter at the bottom. There will also be a

ore veins of great richness on their property, beside deposits of corundum, mica, kaolin and other valuable mines.

The Sykerville Mfg. Co. are being formed at Sykerville, Md., for the manufacture of agricultural implements, probably the Day Chmax cultivator.

W. H. Withgott, Easton, Md., is erecting a building to be occupied by him as a brass and iron foundry.

The iron foundry of the Van Winkle Gin and Machine Company, which was recently burned at Atlanta, Ga., will be rebuilt at once.

It is stated that parties from New York City and Washington, D. C., are in Winston, N. C., organizing an iron works company and at the same time investigating the iron ore deposits in that vicinity with a view to development.

The New Birmingham Iron and Land Company, of New Birmingham, Texas, are interested in the establishment of a rolling mill in that vicinity.

Lilly & Hillsley, of Philadelphia, Pa., are to establish nail works at Kensington, Ga.

The Railroad Supply Company have been organized at Chattanooga, Tenn., by local and Northern capitalists. The company have a capital stock of \$50,000 and will manufacture frogs, crossings, switch stands and all kinds of heavy forgings. It will be the only plant of its kind in the South.

A \$500,000 stock company has been organized at Clinton, Tenn., by parties from New York and St. Louis, Mo., to erect a furnace at Clinton.

The South Pittsburg Pipe Works, at South Pittsburg, Tenn., have recently added new machinery to their plant and contemplate making more additions in the near future.

The steel bloomery, at Anniston, Ala., that has been idle a good while, is shortly to resume work.

The iron foundry of Messrs. Murray & Stevenson, at Anniston, Ala., was recently sold on account of the death of both members of the firm. It was purchased by R. H. Cobb.

Reciprocity with Canada.

Erastus Wiman is indefatigable in his efforts to improve commercial relations between the United States and Canada. The substance of his argument is given in an address last week before the New Haven Chamber of Commerce.

While the tariff recently enacted put up barriers higher than ever against Europe, he said, it recognized at the same time the desire for reciprocal trade with the countries of this continent. But in order that any practical results should come to New England from reciprocity, it must be extended to the whole of America. The cheap raw material, which it is possible for New England to obtain only in Canada, is quite an essential to success in competing for the Southern markets as subventions or reciprocal advantages. The nearby supplies of iron, of coal, of fish and other food products in the maritime provinces would be immediately available under reciprocity with Canada and would give New England an advantage in manufacture both for foreign and home trade of incaluable value. Reciprocity with Canada would also mean a development in that country equal to that of the United States, in which our people could equally participate, thus enriching themselves and the world at large. Markets would be created for New England manufacturers which would readily absorb the surplus of production, and which would have the advantage of free admission to so large a portion of the British empire, while goods from Great Britain and foreign countries would be burdened with tariff equal to that of this country. In Europe, Germany and England are seen dividing a continent in the hope of trade with Africa, inhabited by savages with whom profit is remote and uncertain. Reciprocity with Canada would give the United States free access to a region equally vast and possessing possibilities infinitely greater in wealth and profit. In order to secure these advantages and give

to the United States the influences which, as a nation, it should possess over the whole of this continent, it is necessary to obliterate the trade barriers that now cut it in two parts. This can be done by Congress by adopting the Sherman-Hitt resolution empowering the President to appoint commissioners to prepare a plan for submission to Congress, so soon as the Canadian Government is ready to do likewise. The present government in Canada cannot be expected to respond to this invitation, but a vast majority of the people of Canada are in favor of the closest trade relations with the United States, and this sentiment will be greatly strengthened by the operation of the McKinley bill in doubling the duty of their exports.

New England's Growth.

So much has been said in certain circles concerning the decadence of New England, says the *Boston Daily Traveler*, that there has come to be quite a widespread impression, where all the facts are not known, that New England has been at a standstill in the matter of population and industries, if there has not been indeed an actual falling off. For this reason the complete census returns are of interest, since they show that the rate of increase in population has been greater during the past decade than for any previous decade since 1840-50. The *New York Evening Post* publishes the two following tables, which indicate anything but decadence. The first shows the population of each of the six New England States in 1890 and in 1880:

	1890.	1880.
Connecticut.....	745,861	622,700
Maine.....	660,261	648,936
Massachusetts.....	2,233,407	1,783,085
New Hampshire.....	375,827	346,991
Rhode Island.....	345,343	276,531
Vermont.....	332,205	332,286
Total.....	4,692,904	4,010,529

This gives an increase during the last decade of 682,475, or a rate of 17.02, and the following table, showing the absolute increase in the population in each decade since 1790 and the percentage of increase, shows that during no decade has there been so large an increase, and in but few previous decades so large a percentage:

Date of census.	Population.	Percentage of increase.	Increase.
1890.....	4,692,904	17.02	682,475
1880.....	4,010,529	14.98	522,605
1870.....	3,487,924	11.25	352,641
1860.....	3,135,283	14.92	407,167
1850.....	2,728,116	22.07	493,294
1840.....	2,234,822	14.33	280,105
1830.....	1,954,717	17.78	295,138
1820.....	1,659,579	12.74	187,606
1810.....	1,471,973	19.38	238,962
1800.....	1,233,011	22.14	224,303
1790.....	1,008,705	.....	.....

This is certainly a gratifying showing, though the first table shows that the large proportion of this increase has been made by the three Southern New England States. Northern New England, however, even with the much-talked-of abandonment of farms, more than holds its own, and with the growth of its manufacturing industries, which is almost certainly assured, its future is guaranteed. It may be true that New England, as an agricultural section of the country, has reached its growth, but it has a bright future before it as a manufacturing center, and there is every reason to believe that manufacturers will continue to push themselves further and further northward.

The old Warwick Furnace farm, in Chester County, Pa., where cannon were made in revolutionary days for the patriot army, and where iron manufacture in the State had its early beginnings, will be sold at public auction November 1.

A Suspended Feed Table for Rolling Mills.*

BY JAMES MORGAN, PITTSBURGH, PA.

The convenience of mechanical arrangements for handling ingots, blooms, billets, bars, beams, &c., and feeding them to the rolls, is so universally recognized as to require no demonstration.

In the rolling of heavy beams, such as are now coming into general use, such arrangements are practically essential, by reason of the difficulty and expense of the manual handling of the large masses of metal treated. I submit herewith the drawings of a rolling mill feed table, designed and patented by myself, which I think will be found simple in construction and operation, not likely to get out of order, and efficient in performing the work for which it is intended.

Fig. 1 is a sectional plan, taken on the line I I of Figs. 2 and 3. Fig. 2 is a vertical, longitudinal section on the line II II of Figs. 1 and 3. Fig. 3 is a vertical cross section on line III III of Figs. 1 and 2.

As the details of the drawings are numbered throughout, and the same number always indicates the same part, I cannot more clearly describe the mechanism than by giving the following key to these numbers:

Nos. 2 and 3 are the sets of rolls (here shown as three-high rolls, though that is not absolutely necessary.)

Nos. 4, 4 are the two feed tables, one on each side of the rolls. The side frames of the tables are made of parallel channel bars.

Nos. 5, 5 are the feed rollers, journaled between the channel bars and provided at their ends with beveled gear wheels, 6, 6, which mesh with beveled pinions, 7, 7, on shafts, 8, 8, which latter are driven by elevated power connections, to be mentioned presently.

The tracks, 9, 9, on which the supporting carriages are mounted, are upheld by elevated supports in the building, as shown in Figs. 2 and 3, and extend transversely to the line of the feed tables. They consist of parallel flanged beams, separated so as to permit the passage between them of the suspending mechanism of the feed tables, but connected firmly at intervals by strong yokes, 10, 10, the ends of which underlie and support the tracks, while the middle portions are arched high enough to permit the passage of the trolleys or carriages. These yokes are connected by links, 11, 11, with the bell crank levers, 12, 12, which serve to lift them.

Fig. 3 shows the yokes suspended from the bell crank levers, the latter being fixed to cross shafts, 17, 17, resting with their journals in pillow blocks, 13, 13, on the beams, 14, 14, which extend above the track and parallel therewith, and are suitably supported by the uprights of the building frame.

All the supporting levers on each of the beams, 14, are connected by means of connecting rods, 15, and each is provided with a counter weight, 16, which opposes the weight of the supported feed tables and partially balances the same. One or more of the cross shafts, 17, extends across all of the beams, 14, and forms a common axis or torsion shaft for the laterally adjacent bell crank levers, 12, so as to connect operatively the whole system of levers and to cause them all to respond to the motion of any one. One of the end levers of the set is connected with the plunger of a hydraulic motor, 18, by a flexible connection, 19, a quadrant lever, 48, and a connecting

* Paper presented at the New York meeting, September, 1890, of the American Institute of Mining Engineers.

rod, 49. The motor thus serves to actuate all the levers, as will be readily understood, so that by the movement of the plunger up or down all the tracks may be simultaneously and uniformly elevated or lowered.

Each of the tracks is provided with a trolley or carriage, 20, mounted on wheels, 21, on the track directly above the feed tables, and each carriage is connected to the feed table by means of a frame, 23, composed of strong upright bars attached to the carriage at the upper end and provided at the lower end with a stirrup or hanger, 22, on which the side rails of the feed table are fixed. The stirrups, 22, are cast iron frames open at the side to permit removal of the metal from the feed table. On one of the frames, 23, of each of the feed tables is journaled an upright rotary shaft, 24, provided at its lower end with a bevel pinion gearing with a corresponding bevel gear wheel on the shaft, 8, and at its upper end, at the level of the carriage, provided with a gear wheel meshing with a pinion on a sprocket wheel shaft, 25, which is journaled in the frame of the carriage. Obviously this sprocket wheel shaft is constantly in gear with the driving shaft of the feed rollers, whatever be the position of the feed table and carriage.

The sprocket wheel shaft is driven by means of endless sprocket chains, 26, which pass around sprocket wheels, 27, on a driven countershaft, 28, around sprocket-wheels, 29, at the other end of the track, and in contact with sprocket wheels, 30, on the shaft, 25, and with idler wheels, 31, on the carriage. This arrangement is such that the carriages may be moved along the track without disengaging the sprocket wheels, 30, from the chains, and that in every position of the carriage the motion of the chains will rotate the shaft, 24, and through it the rollers of the feed table. The countershaft, 28, is adapted to be driven in either direction by means of power connections between it and a shaft, 32, which is connected, through suitable power connections and an intermediate shaft, 33, with the driving shaft of an engine, 34.

The power connections between the shafts, 28 and 32, consist of two belts, 35 and 36, one of which is crossed, and the belt pulleys on the shaft, 28, are provided with clutches, 37, operated by a lever, 38, by which either pulley may be put into gear with the shaft. These pulleys effect the driving of the shaft in opposite directions, and thus enable the feed rollers of each table to which the shaft is indirectly connected to be driven in either direction.

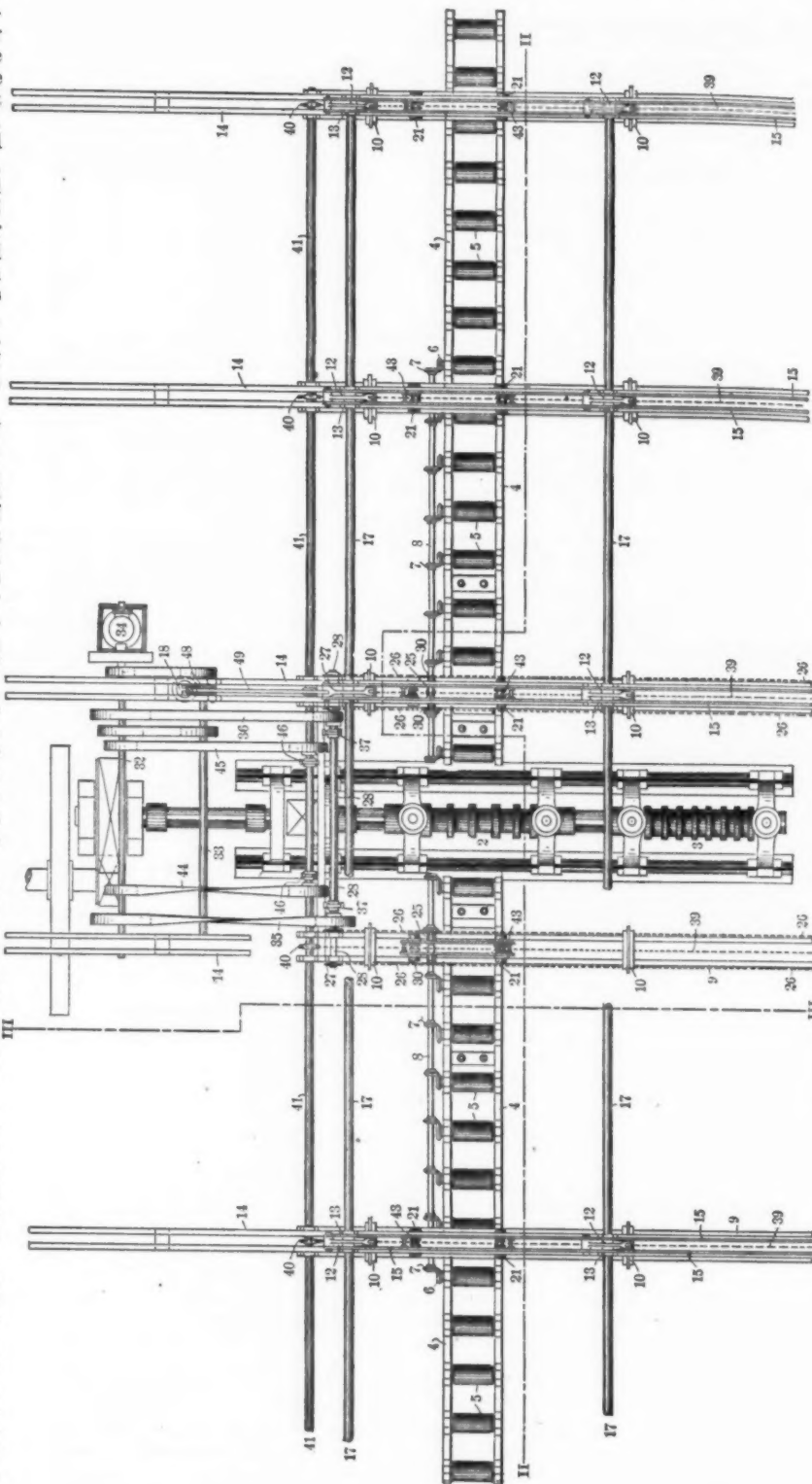
Each of the carriages is moved backward and forward on its track by means of chains, 39, which pass around sprocket wheels, 40, on a shaft, 41, and around sprocket wheels, 42. The ends of these chains are fastened to the carriages, as is shown in Fig. 3.

The idler wheels, 43, on the carriages support and guide the moving parts of the chains. The shaft, 41, is driven by belts, 44 and 45 (one of which is crossed) from the shaft, 32, and the belt pulleys on the shaft, 41, are provided with clutches, 46, which are operated by means of a clutch lever, 47, in the manner before described with reference to the clutches, 37 and lever, 38, so that by means of these clutches the shaft, 41, may be driven in either direction and the carriages caused thereby to move backward or forward on their tracks, as may be desired.

The operation of the feed tables is as follows: In order to move the tables laterally from one pass of the rolls to another, or from one set of rolls to another, the carriages, 20, are caused to move on their tracks in the manner already described. By this motion the feed rollers will not be disconnected from gear with the driving mechanism on the carriages, which may be caused to operate in either

direction, as I have explained. If the feed tables be used in connection with three-high rolls, they may be raised or lowered to shift the metal from one pass of the set of rolls to the next, either above or below, as the case may be, by action of the hydraulic motor, 18, by means of which the tracks, 9, and the supporting carriages may be raised or lowered. The driving of the feed rollers and the lateral motion

able freely. When the feed table is at its normal position in front of the passes of the rolls, these rods hang down below the tables, the tops of the rods being below the level of the feed rollers, as shown by full lines in Figs. 2 and 3. If it be desired to turn the metal piece that is on the table over the rods, 50, the table is lowered until the lower ends of the rods, 50 and 51, strike the floor of the mill. This



Suspended Feed Table.—Fig. 1—Sectional Plan on Line I-I of Figs. 2 and 3.

of the feed table are effected by means of the levers, 38 and 47, and the hydraulic cylinder may be actuated or controlled by means of a valve situated in proximity to the levers, so that the whole system may be under the control of a single person.

The means for turning the metal piece over on its side on the feed tables, as shown in Figs. 1 and 3, comprise a suitable number of rods, 50 and 51, set vertically and loosely in cross pieces, 52, of the feed table, so that they shall be mov-

causes a relative upward motion of the rods, as shown by dotted lines in Fig. 3, and the rods, 50, engaging the metal, raise it and tilt it over on its side against the now elevated rods, 51, which serve as stops. By providing the ends of the rods, 50, with steps, so as to enable them to engage at more than one place with the metal, the metal may be turned several times on the table.

I need add but little to the foregoing description. As will be seen at once by

those who understand the requirements of rolling mill practice, the leading peculiarity of this system is, that the feed table is suspended from above, instead of being supported from below. The advantages of such a suspension are easily appreciated; and attempts, more or less elaborate, have

tion and propulsion. I venture to think that this somewhat complicated problem has been successfully solved in the accompanying design. But that is an opinion which would carry greater weight if it should be confirmed by the verdict of the competent rolling mill engineers of the

carry 24 midshipmen. For the first voyage the cost of this instruction will be \$350; the second voyage, \$300; third voyage, \$250; fourth voyage, \$150; fifth voyage, \$100. It is expected by the end of the fifth voyage to the antipodes and back the young men will have received a

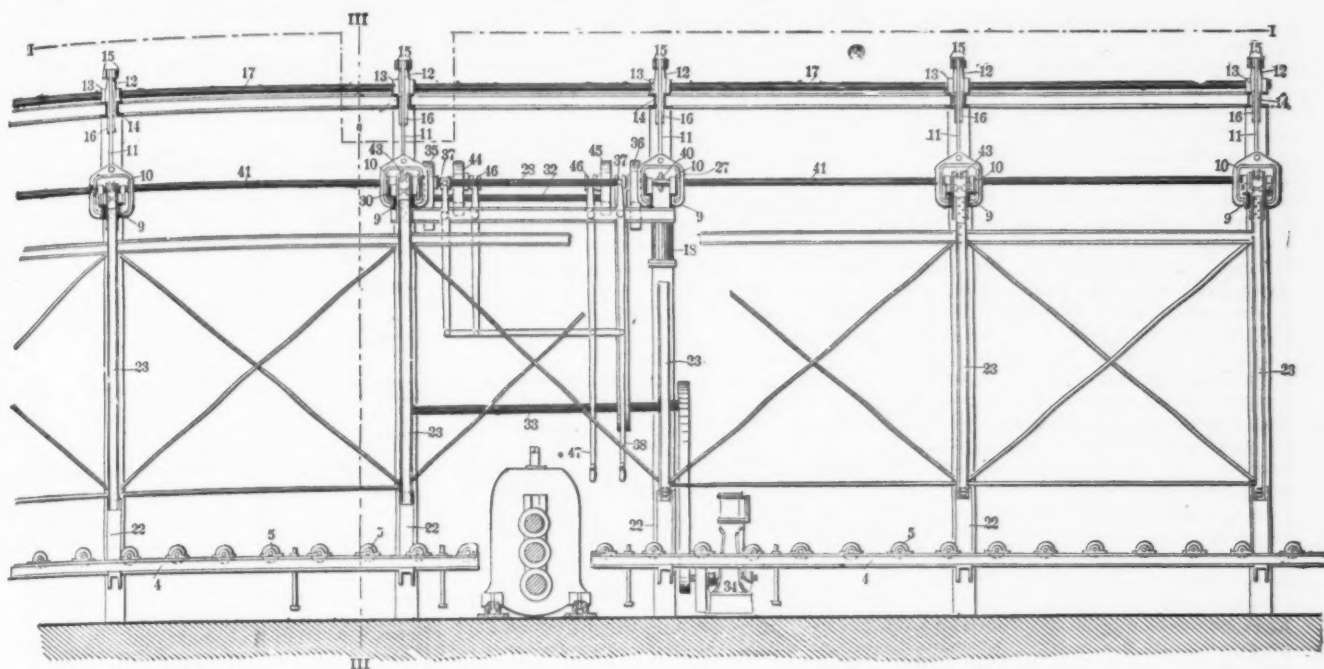


Fig. 2.—Vertical Longitudinal Section on Line II-II of Figs. 1 and 3.

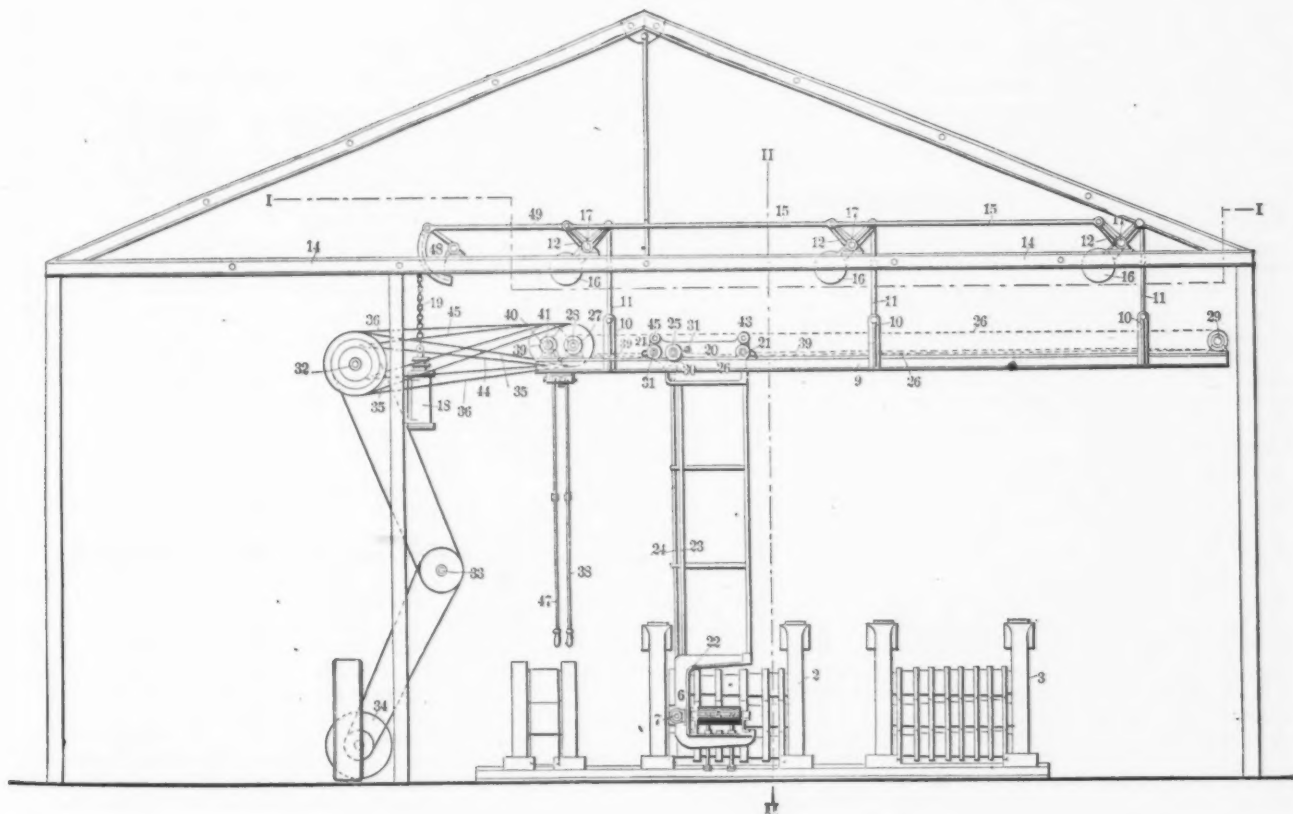


Fig. 3.—Vertical Cross Section on Line III-III of Figs. 1 and 2.

been made to secure them. But the fact that the general practice, especially for heavy work, is to support the feed tables from below, indicates that these advantages have thus far been outweighed by the difficulties attending the overhead construction, particularly when lateral as well as vertical motion is to be effected and controlled, and the turning of heavy masses is to be combined with their eleva-

Institute, to whose judgment it is respectfully submitted.

To provide a means of training for boys intending to enter the merchant service, Lord Brassey, with the co-operation of a firm of ship owners in London, has arranged that two ships engaged in the Australian trade shall be specially adapted for educational purposes. Each ship will

training and experience that will qualify them to take the positions of junior officers in the merchant service.

The Canadian Government has removed the export duty on pine and spruce logs, evidently in expectation that the United States will reciprocate by removing the import duty on pine lumber.

OUR VISITORS IN THE WEST.

The Engineers and Metallurgists Visit Chicago and the Lake Superior Iron Ore and Copper Districts.

Our visitors of the Iron and Steel Institute and the Verein Deutscher Eisenhuettenleute met with a most cordial reception when they arrived at Chicago on the morning of the 13th inst. They filled three special trains, composed in all of 27 Pullman sleeping cars. A committee representing the city government went out to Grand Crossing early in the morning, met the trains, and escorted the visitors into the city. At the depot of the Pennsylvania Railroad Company they were met by a delegation from the local Reception Committee, composed of W. R. Stirling, E. C. Potter, D. L. Barnes, W. F. Merrill and George Harvey, who directed the visitors to the various hotels to which they had been assigned. This work was so well systematized that there was no confusion or uncertainty, and a marvelously short time sufficed to accomplish the task of distributing the regiment of people who debarked from the trains. The headquarters of the local Reception Committee were established at the Palmer House, and Manager Townsend, of that hotel, was most assiduous in his attentions and did everything in his power to secure the comfort and convenience of his guests. The assignments to outside hotels covered the Auditorium, Richelieu, Leland, Wellington, Grand Pacific and Sherman. All the visitors were comfortably domiciled, and Chicago received flattering encomiums for the magnificent manner in which they were entertained. O. W. Potter was chairman of the local Reception Committee; Robert W. Hunt was secretary and treasurer; H. S. Pickands was chairman of the Financial Committee; W. R. Stirling was chairman of the Transportation Committee; Octave Chanute was chairman of the Headquarters Committee, and Geo. W. Cope, with a corps of active assistants, was in direct charge of the headquarters. Several stenographers and an interpreter were provided for the use of the visitors. As far as human foresight could extend every arrangement had been made for the convenience and entertainment of our foreign friends, but a heavy rain storm set in which interfered with the programme to some extent.

Promptly at 10 30 Mayor Cregier appeared in the large parlor of the Palmer House, where the visitors had assembled under the leadership of O. W. Potter, Sir James Kitson and Alexander Thielen. In a very graceful and complimentary speech, Mayor Cregier welcomed them to Chicago, and presented the freedom of the city, handsomely engrossed, bound in Turkey Morocco and emblazoned with the English, German and American flags. Sir James Kitson and Herr A. Thielen responded in felicitous terms in behalf of the two great organizations which they represented. The formal programme was then entered upon. The rain prevented, to a great extent, the drive which had been arranged to Washington Park, but some of the visitors were not to be deterred from thus viewing the boulevards. The great majority were taken by train to the Washington Park club house, where they enjoyed a bountiful lunch while listening to music furnished by the Second Regiment Band. The guests were comfortably seated during the repast, and after it was ended they were addressed by O. W. Potter, who called attention to the fact that the chief officials of the World's Fair directory were present, and called on

Lyman J. Gage to make some remarks on the subject. Mr. Gage is an excellent speaker and made a generally pleasing address which, however, contained some allusions to recent tariff legislation that were out of place under the circumstances. Thomas B. Bryan, of the World's Fair directory followed in a brilliant speech, which was conceived in such a happy mood that good feeling was restored. Mayor Cregier and Sir James Kitson also spoke with good effect. Toasts were drunk to Queen Victoria, Emperor William and the President. On the return to the city the fire department was called out and gave a display of the appliances used in Chicago for quenching conflagrations. Harbor boats participated in the display and the visitors were shown the immense streams of water that could be thrown by the city fire boats, which are claimed to have the most powerful machinery used in the world for that purpose.

During the day a number of excursions were taken by separate groups to points of interest in and near the city, such as the Chicago Tire and Spring Works, the McCormick and the Deering reaper works, Fraser & Chalmers' great machine works, the new water tunnel under the lake, &c.

In the evening a reception was held in the Auditorium Hotel, and the visitors had the opportunity of fully inspecting this recent acquisition to Chicago's architectural achievements. The theater was in use during the evening by Strauss' orchestra, and the boxes were reserved for those attending the reception, who were enabled to pass into the boxes from the hotel. The magnificent proportions and complete appointments of this building evoked a general expression of admiration from the visitors, who were surprised to find that it was a private enterprise, receiving no assistance from the Government. The reception was a perfect success in every respect.

Tuesday was ushered in by clear skies and bracing winds. The event of the day was an excursion to the South Chicago works of the Illinois Steel Company, the works of the Fowler Steel Car Wheel Company and to the various enterprises located at Pullman. The visitors were regaled by a lunch at Pullman. It was a day of thorough entertainment and an excellent impression was given our foreign guests of the magnitude of Chicago's industrial interests. On this day also there were a number of special excursions to points of interest, including visits to the stock yards, meat packing establishments, grain elevators, &c. At the close of the day hurried arrangements were made for the departure of the visitors, who divided into two parties, one going South to visit the Southern iron districts and the other going North to inspect the Lake Superior iron ore and copper districts. A universal feeling of regret was apparent at the short stay in Chicago, which had but served to give them a taste of the wonders to be seen in that city.

The trains North and South had been timed to depart at the same hour, 8.30 p.m. The Southern train left via the Pan Handle route of the Pennsylvania Railroad and the Northern train via the Chicago and Northwestern. The following is a list of those taking the Northern excursion:

IRON AND STEEL INSTITUTE.

Alleyne, Sir John G.	Bruce, J. M.
N., Bart.	Bruce, Mrs.
Alleyne, Lady	Bruce, Miss
Alleyne, Miss	Bruce, W. D.
Alleyne, Miss	Bruce, Mrs.
Allbright, John F.	Davies, Wm. Sheffield
Beard, Geo.	Day, Richard
Bell, Chas.	Drummond, S.
Bell, Robert	Drummond, Mrs.
Blair, G. M.	Fry, W. S.
Blair, Mrs.	Fry, Theodore, M. P.

Geen, Geo.
Geen, Mrs. Geo.
Geen, W. R.
Gloom, Miss
Guillaume, Emil
Guillaume, Max
Haas, O.
Haedicke, Hermann
Hall, J. F.
Hawksley, G. W.
Hawksley, Mrs.
Hay, Alex.
Hay, Mrs.
Horsfield, A.
Hulton, Harrup W.
Jeans, J. S.
Johnston, Jas.
Kiefer, Jos.
Krabler, E.
Lever, Ellis
Lever, Mrs.
Massey, W. H.
Massey, Mrs.
Mungall, J.
McLachlan, Thos.

Oser, Joh.
Pattison, John
Purves, D.
Purves, Mrs.
Richards, Edwin
Richards, Mrs.
Rowley, Brooke
Sharp, T. B.
Smith, Fred'k
Snelus, G. J.
Snelus, Mrs.
Snelus, Miss
Sochor, Baron F.
Sparrow, John W.
Sparrow, Mrs.
Steel, James
Storey, C. R. C.
Tannet, J. C.
Thompson, James
Thompson, H.
Walker, W. H., Jr.
Ware, C. W.
Ware, Miss
Wood, B. G.

VEREIN DEUTSCHER, EISENHUETTENLEUTE.

Blass, E.	Mischke, C.
Bleichert, A.	Narjes, Th.
Bloem, Dr. G.	Nolda,
Brauns, H.	Poensgen, Emil
Bredt, Rudolf	Pohl, J.
Burgers, F. E.	Remy, Mr.
Custodis, Alfons	Remy, Mrs.
Daelen, R. M.	Reinhardt, O.
Daelen, Mrs.	Sachsenberg, Gotth.
Deussen, W.	Schlink, J.
Glaser, F. C.	Schultz, F.
Gross, Dr. Otto	Schultz, Miss
Gregor, Georg	Schultz, Miss
Grillo, Aug.	Steinbrecht, E.
Groove, Th.	Stuehlen, Max
Havestadt, Chr.	Stuehlen, Peter
Harbertz, F. A.	Schoen, E.
Hesse, Hubert, Jr.	Vogelsang, Dr. R.
Hoette, Emil	Waldthausen, Aug., Jr.
Joseph, Lud.	Waldthausen, Eugene
Klingelhoefer, Dr.	Wandeleben,
Klönne, Aug.	Weuste, Chr.
Koerner, Hugo,	Wippermann, H.
Lunge, Dr.	Zanders, Hans
Mannesmann, Robert	

JAPAN.

Kitsunesaki, T.	Tsuno, T.
-----------------	-----------

AMERICANS.

Birkinbine, John	Morse, Miss Florrie
Brough, H. Bennet	Norrie, A. L.
Baurmann, H.	Pitkin, Stephen H.
Bertollet, A. S.	Platt, F. J.
Buel, John L.	Platt, Jos. C.
Cope, Geo. W.	Platt, Mrs. Jos. C.
D'Invilliers, E. V.	Parker, R. M.
Eustis, W. E. C.	Smith, Oberlin
Ellicott, H. T.	Smith, Mrs.
Fayerweather, W. O.	Somers, W. H.
Francis, L. W.	Stowell, W. H. H.
Hollis, H. L.	Stevenson, John, Jr.
Holland, Col.	Venstrom, Olaf
Kunhardt, W. B.	Valpy,
Lewis, J. F.	Wilkes, Paul
Lewis, Mrs.	Wilkinson, Geo. B.
Longdon, Miss Helen	

Visit to Iron Mountain, Mich.

On the morning of the 15th the Northern excursionists awoke at Iron Mountain, Mich., where the Chapin, Ludington and Hamilton mines are located. They were here provided with a very carefully prepared pamphlet by George W. Goetz, descriptive of the mines and machinery of the Chapin Mining Company, which pamphlet was of great assistance in inspecting the property and plant. The sad intelligence was communicated to the visitors that during the previous night a slip had occurred in the Ludington mine, burying five men. Two had been quickly rescued, a third was within hopeful reach, but it was feared that two were lost. Carriages were taken by the entire party for the Quinnesec Falls of the Menominee River, three miles distant, to see the hydraulic power plant, which furnishes compressed air to the mines. The falls furnish a natural head of water of about 52 feet, and a deflecting wing dam turns the water into a flume from which the water is led to turbines through iron penstocks 7 feet in diameter. There are three 48-inch turbines and one 54-inch. The compressors were built by the Rand Drill Company and consist of three pair of 32-inch diameter

and 60-inch stroke and one pair of 36 x 60 inch. The average air pressure is 60 pounds, the pressure at the mines being 2 to 3 pounds less. The main pipe from the hydraulic works to the mine is a 4-inch riveted wrought iron pipe, 24 inches in diameter, with expansion joints every 480 feet. The horse-power developed is about 1700, the available power of the falls being estimated at 6000. The compressed air provides the motive power for the entire machinery plant and for 105 power drills, and the compressor plant is believed to be the largest in the world. Batteries of steam boilers are always kept in readiness for use in case of accident to the compressors.

On returning to Iron Mountain the excursionists were taken to the Chapin Mining Company's new warehouse, where they were comfortably seated and served with a most excellent lunch, after which addresses were made in recognition of the company's hospitality by Sir John Alleyne, J. G. Snelus, Director Brauns and J. Schlink, to which an appropriate response was made in behalf of the company by John L. Bucl.

After lunch the visitors were divided into a number of parties to visit the mines. A number of them took the opportunity offered to go underground, but most were satisfied to inspect the surface workings. The engine houses were visited, the pumps were examined, and many questions were asked relative to wages of miners, cost of living, cost of extracting ore, freight to consuming points &c. It was learned that the Chapin mine this season will produce about 800,000 tons of ore, averaging 62.13 per cent. of metallic iron and 0.068 of phosphorus, except the particular quality known as Crescent ore, which averages 64.55 iron and 0.044 phosphorus.

The ore is very easily reduced in the blast furnace. It is raised from four shafts, lettered A, B, C and D. The C shaft is at present the principal one. It has raised as much as 2700 tons in 24 hours. The D shaft was sunk through a water-bearing stratum of quicksand by the freezing process of the Poetsch Freezing Company. Twenty-six wrought iron pipes, 8 inches in diameter (closed at the lower end), were arranged in a circle of 29 feet in diameter and extending partly into the ledge of rock. Inside of this pipe a 1½ inch pipe extended to within a few inches of the bottom. At the surface both pipes were connected to a Linde refrigerating machine, which maintained a circulation of saturated solution of chloride of calcium at a temperature of about zero, F. A wall of frozen quicksand about 13 feet thick thus formed outside of the circle of pipes. Inside of the pipes the frozen quicksand had to be drilled and blasted just as if it were rock.

The number of men employed at the Chapin mine varies from 1800 to nearly 2000. It is the intention to build out the stock piles in such a form during the coming winter that the full benefit of a steam shovel can be derived in the loading of cars upon the opening of navigation. The steam shovel was built by the Bucyrus Steam Shovel and Dredge Company. The capacity of the scoop is 2½ tons. The shovel is guaranteed to load 3000 tons in ten hours. The cost of loading cars by means of a steam shovel is considerably lower than when done in the ordinary way. A 20-ton ore car can easily be loaded in four minutes. The new ore cars all carry not less than 20 tons of ore, are equipped with automatic couplers, and the new Westinghouse automatic freight brake with triple valve. The equipment of the mine covers an excellent machine shop, blacksmith shop, saw mill, electric light plant and laboratory.

The excursionists left Iron Mountain in the evening for Hurley, in the Gogebic iron ore district.

The Gogebic Range.

The first mine visited on the Gogebic range on the 16th inst. was the Norrie. President Currie, of the Metropolitan Land and Iron Company, Captain Day and others were in readiness to receive the visitors and to escort them to points of interest. The Norrie and Pabst mines, owned by this company, cover in all 240 acres of land, upon which they have 11 working shafts, and are now putting down more to secure a still greater output of ore. The vein has been opened up for fully three-quarters of a mile in length, and its width will average about 100 feet. In one place it is 300 feet wide. The shipments of Norrie ore since the mines were opened have been as follows:

Year.	Tons.
1885.....	15,419
1886.....	124,844
1887.....	217,254
1888.....	412,196
1889.....	674,394

Total shipments to January, 1890, 1,444,107

During the present year they have shipped up to October 1 about 700,000 tons and estimate their output for the entire season at 900,000 tons. This is a wonderful record for a mine. All of the ore is of strictly Bessemer quality. The equipment of the mine is of the most excellent character in order to secure such results. A steam shovel is employed to load cars from the stock piles. The shovel takes 2 tons at a time and loads a 20-ton car in four minutes. It is operated by its own engine, housed on a car, for which a temporary track is laid wherever it may be required. The visitors were interested to see the snow and ice of last winter uncovered as the shovel made its way rapidly through a stock pile which had been made at that season. This shovel is a novelty in ore loading, having been introduced for this purpose the present year. J. L. Colby, of the Penokee and Gogebic Development Company, owners of the Colby, Aurora, Superior, Palms and Comet mines, welcomed the visitors to an inspection of those properties. The following particulars concerning these mines were furnished:

The Colby Mine alone during the past four years has mined upward of 1,000,000 tons and covers an extent of territory a mile and a half along the course of the vein and a half mile in width. There is fully one mile of this distance upon which practically no work has been done as yet, except in the way of exploration; this, however, has already proved the existence of a large body of ore. The company are now sinking new shafts to open up this portion of the mine. In certain portions of the Colby Mine manganese is found in quite large quantities, so that last year the company succeeded in selecting out about 80,000 tons of manganese ore, containing over 7½ per cent. of manganese. The general quality of the ore in this property is a high grade Bessemer. The Palms Mine adjoins the Colby on the east and runs half a mile along the course of the vein. The mine is comparatively new, and until this past year the shipments have been small. The output for this year will be about 60,000 tons; the estimated output for 1891 is 150,000 tons. The ore is Bessemer quality—63 per cent. metallic iron, 0.045 per cent. phosphorus. The Comet Mine is also a new one, located about 5 miles east of the Palms Mine, and the ore is of the same fine quality as the Palms. The Aurora Mine is located about 4 miles west of the Colby Mine, and during the past two years has produced nearly 500,000 tons. This ore will average 62.5 per cent. metallic iron, 0.028 per cent. phosphorus. The Superior Mine is a new mine, but has a large body of manganese ore running above 10 per cent. in manganese, from which they expect to ship this coming season upward of 75,000 tons.

Other prominent mines on this range, such as the Ashland, Germania, Montreal, Hennepin, Cary, Brotherton, &c., were not visited for lack of time. The day was not without its adventures. In rounding a sharp curve the trucks under two cars

left the rails, but as the train was then proceeding very slowly no special damage was done, and the skillful railroaders soon had them put to rights. One or two parties wandered over the hills and had a long tramp to the rendezvous at Bessemer, whence the train departed late in the afternoon for Houghton, in the copper country of Michigan.

The Michigan Copper Mines.

The 17th and 18th were spent in examining the wonders of the Lake Superior copper district. Matters here were greatly facilitated by the distribution among the visitors of a very complete pamphlet giving general information relative to the different copper mines, concentrating plants, smelting works, &c., grouped about Portage and Torch Lakes. Hon. Jay A. Hubbell was chairman of the local committee and Peter Préméan was secretary. They and the members of the committee were indefatigable in their attentions, and did everything possible to secure the enjoyment of their guests, who were, in turn, lavish in their praises of the generous hospitality extended to them. An itinerary had been arranged for both Friday and Saturday, which was carried out to the letter and almost to the minute.

The first place visited was the Calumet and Hecla Smelting Works, to which the excursionists were taken by special train. This is a large plant, consisting of a number of detached buildings, embracing mineral houses for receiving mineral or concentrates from the stamp mill, refining furnaces, blister furnaces, boiler house, machine shop, &c. There are 16 refining furnaces, located in four buildings, having four furnaces each, with a capacity for working 14 tons apiece of mineral every 24 hours. Most of these furnaces were casting wire bars for manufacturing electric wire. These bars are about 4 feet long, 3 inches square, and weigh 130 to 135 pounds. The mineral or concentrates from which they are cast runs about 75 per cent. in copper, and the furnaces are of the reverberatory type, using bituminous coal. The blast furnaces handle the slag from the refining furnaces and make weekly campaigns, each having a capacity of 120 tons per 24 hours. The blister furnaces are two in number, one of 10 and one of 16 tons capacity, and are used for blistering or partially refining the black copper from the blast furnaces.

The visitors were next taken to the Calumet and Hecla stamp mills to see the method of dressing the ore. This plant consists of two mills, one 465 feet long by 180 feet wide, and one 330 feet long by 180 feet wide, the two mills covering about 2½ acres of ground. The stamping outfit consists of 18 Leavitt stamps, having a stamping capacity of 240 to 250 tons of rock each per 24 hours, or a total of about 4500 tons per 24 hours. The stamps make 98 blows per minute, the moving parts weighing about 5000 pounds, and make the blow at a velocity of 20 to 22 feet per second, the rock being crushed with water, which carries it through screens punched with ¾ inch holes to the washing machines. The gangue is classified in the Richards & Coggin separators into five classifications, four of which are treated on the Collom jigs, of which there are 624 in both mills, or about 7500 square feet of sieve surface. The fifth classification is slime, which is treated upon revolving slime tables, of which there are 72, having a total area of about 16,500 square feet. The waste sand with the water runs into two sand wheels 43 feet in diameter, which deliver it into elevated launders, which convey it into the lake. Another sand wheel is in process of erection, which is 53 feet in diameter. The motive and pumping power is at one central station. The driving engine, from which motion everywhere is transmitted through wire

ropes, is a Leavitt vertical compound engine of 650 horse-power. The three pumps at present in use have a capacity of 50,000,000 gallons in 24 hours, and another is being erected with a capacity of 51,000,000 gallons.

Calumet was the next place visited. Here the excursionists were conducted to a large hall, in which they observed the welcome vision of long tables with inviting edibles, and chairs for everybody. The lunch was superb, even to the Lake Superior "water" with which the *menu* ended. The *menu*, by the way, was printed on a sheet of polished Lake Superior copper, making a very neat *souvenir*. Hon. Jay A. Hubbell, presided, and when the repast was ended made a very happy speech of welcome to the copper district. Sir John Alleyne responded for the Iron and Steel Institute. Director Brauns, of the Verein Deutscher Eisenhüttenleute, followed in a German speech. Theodore Fry, M.P., made a pleasant address, after which Dr. Lunge, of Zurich, delivered a ringing speech abounding in lofty thought. The chief of the expedition was not forgotten, and thundering calls brought J. F. Lewis to his feet, who then took occasion to explain the movements of the Northern excursion for the remainder of the journey.

After lunch the visitors were escorted to the surface plant of the Calumet and Hecla Mine.

(To be continued.)

VIRGINIA IRON NOTES.

A development company has recently been organized at New Castle, Va., having a capital of \$250,000, with A. E. Humphreys, president and general manager; William S. Yodes, vice-president, and Frank Woodman, treasurer. The object of the concern is to develop the rich mineral deposits of that vicinity, and it is said that a blast furnace, the first industry to be established in this direction, will be closely followed by other iron industrial plants.

The Irish Creek Mineral and Development Company is the name of a corporation organized to advance the iron making interests of Cornwall, Rockbridge County, Va. This company have a maximum capital of \$800,000, and own over 5000 acres of rich mineral lands. Cornwall is situated eight miles from Buena Vista, and is the site of the first iron furnace ever operated in Virginia.

The newly organized Virginia Steel, Iron and Slate Company, at Logan City, Va., have a maximum capital stock of \$2,000,000, and own 20,000 acres of mineral lands, besides 4000 acres of town site property surrounding and including the town of Howardsville. There are said to be large quantities of magnetic, specular and brown hematite ores on the company's property.

At Front Royal, the Massanutten and Shenandoah Valley Mining, and Improvement Company have been incorporated, with a capital stock of \$1,000,000. George V. Leicester, of Worcester, Mass., is president, and C. A. Macatee secretary.

The Low Moor Mining and Development Company were recently organized at Staunton, with S. M. Yost as president, Hain Sheppard vice-president and general manager, and John McQuade secretary and treasurer. They have purchased 500 acres of land near Low Moor, through which the iron ore runs for nearly 2 miles. There are two furnaces already in operation at this place, and \$80,000 worth of improvements are soon to be made upon them.

The Roanoke Iron Company, of Roanoke, have placed an order with the Robinson-Rea Mfg. Company, of Pittsburgh, Pa., for a complete plate mill, including boilers, piping and machinery. There will be a 36 x 48 inch engine, 26-inch three high train, with tables and guillotine shear to cut $\frac{3}{4}$ inch plates.

The Wythe Lead and Zinc Mines Company, of Ivanhoe, are developing one of the most extensive veins of iron ore to be found in Southwest Virginia. The vein has an average width of 45 feet, and the bottom has not been found. Shafts and drifts have been sunk and cut at regular intervals, and the ore is the same throughout.

It is stated at Lynchburg that a New York plow works is shortly to be removed to West Lynchburg.

Southern Tin Making.

Whether it be due to the enactment of the McKinley Tariff bill or not, a sudden spurt has manifested itself in the South in the tin making industry. The readers of *The Iron Age* have already been made acquainted, in a casual way, with the tin mineral possibilities in various localities of the South. The raw material so long undeveloped is now likely to unhouse its latent power and contribute generously to the still greater expansion of Southern industrial activity.

Near the vigorous iron community of Buena Vista, in Virginia, an Anglo-American enterprise—the Lock Laird Estate and Universal Company, Limited—a few weeks ago drove its first stake down for the town of Savernake, named in compliment to the English country residence of the president of the company, Lord Henry Brudenell Bruce, M. P. for Wiltshire, England.

Here it is intended to establish a large tin making industry. A company composed of practical tin plate manufacturers formerly of Swansea and a number of capitalists from Virginia, Chicago and Philadelphia has been organized to exploit this undertaking. The plant is to be equipped with all the improvements of a thoroughly modern tin plate mill. The Siemens-Martin open hearth "pig and ore" process will be used in the making of the steel, and the tinning will be accomplished by means of the "single pot" process, newly in vogue. It is stated that this company has come into possession of valuable patents in pickling machines and regenerating acid and saving scale. The capacity of this plant is designed to be at first 3500 boxes IC tin plate per week, and will be constructed so that this output can be increased to 8000 boxes. Besides the ferromanganese furnace, an 80-ton iron furnace is to be built, and a number of important industries are being planned for, among which are iron bridge works, iron foundry and machine shop, malleable iron works and hardware factory.

There are good supplies of brown iron ore near by, and also of manganese, of a quality equal to that of Crimora. There is limestone in abundance and fire clays of superior quality. Altogether it is a favorable location for the establishment of this industry.

At Wheeling, W. Va., the Brilliant Iron and Steel Company, newly organized, will construct a steel plant and will add a tin plate mill. The Crescent Sheet Iron Works, at the same place, will add a tinning department and commence tin making at once, as they have all the necessary equipment for the manufacture of the plates. The *Ætna* Iron and Steel Company and other similar Wheeling plants are like to commence the manufacture of tin plate, as all the equipment they lack is the tinning plant, and this can be put in at comparatively insignificant cost.

This small cost of transforming a sheet steel mill into a tin plate plant is likely to induce the newly organized Cardiff Rolling Mill Company, at Cardiff, Tenn., to also begin the manufacture of tin plate after their plant is in operation.

At Baltimore, Md., it is stated that a \$5,000,000 company, backed by New York and home capital, has organized to establish a large tin plate mill in or near that city. It is further stated that the contract for the construction of this plant has already been given to Messrs. Lewis Brothers, of Pittsburgh, Pa.

It is also stated that the Southern Iron Company, of Chattanooga, Tenn., intend to commence soon the construction of a tin plate mill, which they have had in contemplation some time.

The Flow of Metals and Its Relation to Testing.

By P. KREUZPOINTNER, ALTOONA, PA.

ON CONTRACTION.

When examining into the phenomena of contraction or reduction of area we are met with the singular fact that maximum contraction takes place after the metal has attained its ultimate or maximum strength; or, in other words, the greatest percentage of contraction takes place during the period of a decreasing load which lies between the points of ultimate strength and final fracture. The rate of contraction before ultimate strength is reached is very small. Generally speaking, not much more than one-fifth of the total contraction of area. It depends chiefly on the uniformity of structure of the material what that rate is, and does not seem to follow any definite law, like strength and elongation.

There can be no doubt (and not a few investigators have established the fact in quite a satisfactory manner) that local defects and irregularities in a metal influence contraction to a much greater extent than strength and elongation. Hence the latter two qualities seem to be more reliable exponents of the qualities of a metal. Though the flow may be "jerky," as explained in a former article, nevertheless the rate of elongation in the two periods which mark the testing of metals—from beginning to ultimate strength, and from there to the point of rupture—are more nearly alike than the rate of contraction is in the same periods under most favorable circumstances. The factors which determine elongation appear to be of a kind which tend to equalize the structure. For instance, while the molecules of a soft spot flow more easily than those of a hard spot, in flowing against a hard spot they are dammed up against it, as it were, the softer portion is made denser in structure, and consequently becomes more like the harder portions in its qualities. This very act, however, just described is unfavorable to a uniform contraction, because, since there is a tendency of the molecules to flow toward the center of the test piece, the area on the soft or defective spots is reduced more because the molecules flow away from the edge with greater ease than from the harder or uniformly dense portions, thus producing several "heads," which gives to the edge of the test piece that peculiar wavy appearance which may often be noticed in metal of irregular or laminated structure. As in such a metal fracture will take place in the softest spot, which naturally contracts most, therefore with such metal contraction of area becomes really the exponent of the inequality and irregularity of structure of the metal, instead of being an exponent of its excellence as a material.

The case is somewhat different with very soft and ductile, though homogeneous, material which at the same time is uniform in structure. Such metal is wanting in the "crystalline" part (as mentioned in a former article) which gives the metal strength and stiffness. In this class of metals the wavy line, indicative of irregularity of structure, is displaced by one long uniform sweep or curve beginning at the grips between which the test piece is held or the head (if a shaped test piece) and ending at the artificial "head," at F in the diagram, which marks the point of ultimate strength. In that case contraction between O and F in the diagram is largest at O, decreasing uniformly until F is reached. The writer found cases where the contraction at O was $\frac{1}{100}$ inch more than at F. Such metal, however, is generally too soft for structural purposes or railroad service, the elastic limit being

too low to resist dynamic forces. In searching for the reason why maximum contraction should take place after maximum strength is reached we find the answer in the phenomena of flow.

With the increase of load one molecule of the metal after another is set in motion, until at the point of maximum strength the whole available mass is flowing. At that moment, according to B. Kirsch, first assistant at the Royal Prussian Test Department, the rate of flow and speed with which the load increases is equal. The maximum resistance having been reached at the point of ultimate strength, and all the molecules being set in motion, a smaller load suffices to not only keep them in motion, but to increase the rate of flow. However, only the part between F F takes part in that increased rate of flow, being weaker there than anywhere else, and, since the metal in F O is stronger, contraction becomes a mere local affair, and will, thanks to the shortness of section between F F, defects in the metal or unusual softness, contract more or less excessively at the point of rupture. It is for the reason that local conditions have so much weight in determining the percentage of contraction of area that recent investigators doubt its importance as a measure of quality. The theory of con-



traction presupposes an ideal metal. But an ideal metal is seldom met with in every day practice. Bernhard Kirsch, whose name was already mentioned, gives expression to this fact when he says:*

"As a characteristic of the uniformity of a metal we may take the proportion of the sectional area of the test section between O and F in the diagram to the original test section; the smaller that portion has become in its entire length, the more uniform the material must have been. The reason why in a uniform metal the area between O O is not the same throughout the length of the test section is that there is a point during the test when the flow becomes more rapid in proportion to the advancing load, which, when this point is reached ceases to increase, while the flow continues until rupture takes place. If, therefore, a test piece breaks without local contraction, (that is greater, contraction at the point of rupture than elsewhere) then the metal possesses the highest degree of uniformity in regard to the phenomena of flow." In the three following tables an illustration is given as a confirmation of the foregoing remarks.

The results given were obtained with metal of the same kind, but not from the same maker. The test section was 12 inches long by 1½ inches wide and ⅜ inch thick. The ultimate strengths were within 1500 pounds per square inch of each other. Elongation within 2 per cent. Measurements were taken every quarter of an inch. The figures given are not the actual measurements, however, of contraction but the differences between each two measurements in one thousandths of an inch.

Tables Giving Results of Contraction of Area of Soft Steel, Illustrating the Influence of Structure on the Flow.

No. 1.

0, 4, 1, 1, 2, 1, 1, 3, 1, 1, 1, 1, 5, 7, 10, 13, 19, 36, 77, 110.

No. 2.

0, 11, 6, 11, 6, 8, 4, 3, 1, 2, 1, 1, 4, 1, 3, 10, 15, 18, 47, 58, 117.

* Beitrag zum Studium des Fließens insbesondere: by Eisen und Stahl, in Mittheilungen aus den Koeniglichen technischen Versuchs anstalten zu Berlin, Erstes Heft, 1889.

No. 3.

0, 3, 11, 23, 26, 14, 8, 2, 1, 2, 6, 12, 3, 3, 1, 4, 2, 17, 44, 68, 136.

It will be noticed that the flow in No. 3 metal was very irregular, due to inequality of structure, as revealed afterward by microscopic examination. Yet, according to the accepted theory that contraction is a measure of quality, this metal would have carried the day, being highest in percentage of contraction at the point of rupture. The last four figures in each table are those obtained between F F, while the remaining 16 are for the distances O F. In Nos. 2 and 3 the stopping of the flow and consequent increase in density of the metal at the fourteenth and sixteenth figures respectively indicate the forming of "heads" (at F F in the diagram) and the point of ultimate strength. No. 1 would come nearest to the ideal uniform metal of which B. Kirsch speaks. It will also be noticed how rapid the flow—viz., the increase of contraction—is after ultimate strength is reached.

Why should contraction be influenced by local defects, or, in other words, be indicative of irregularity of structure? If we bend a soft but much laminated piece of steel double, indentations will frequently be seen on the convex surface where the fibers were stretched most. The cavities in the interior of the metal being drawn apart by the stretching of the metal the surface metal is drawn in—flows into the vacant space left. A similar phenomenon takes place when the metal is under tension.

Where the metal is softer the molecules flow easier; where the continuity of the metal is disturbed by a cinder pocket, by lamination, or by a similar defect, the flowing metal naturally tries to fill the space—bridge it over, as it were, in its onward march—and thus leaves a more contracted spot behind than the immediate and homogeneous surrounding metal.

The phenomena here described are not at all conjectural or overdrawn statements to make out a case. Those who are in a position and have the facilities for testing, and who closely study the physical properties of iron and steel of all descriptions, and in quantities of thousands of tons, necessarily come frequently across phenomena in metals which are not always in conformity with accepted theories. Nothing is further from the writer than to undervalue and decry theory. He himself is sometimes called a theorist, because he believes that the exclusively practical man is out of place in a technical age, and is rapidly crowded out of existence as a guiding mind by the demands of industrial progress and changes in economic conditions. But the theoretical metallurgist is sometimes apt to set up an ideal standard, which, in every day practice and under everchanging economic conditions, cannot be attained. It puts the producer on the defensive, a position which is highly detrimental to progress. Moreover, when an attempt is made to carry such ideal standards into every day practice in either the producing or testing of metals, a tendency is created to give too much prominence to the one or other property of a metal.

Thus the fact is lost sight of that the properties of metals are not only a complicated affair in themselves, but that their action and effects upon one another are such as to make the singling out of a particular property to serve as the most reliable exponent of quality a dangerous undertaking. The results are not always satisfactory, and therefore antagonistic to the most economic application of materials. D. Adamson, ex-president of the Iron and Steel Institute, struck the keynote of the situation when he said in his paper, read

before the Institute in 1879, that "the best manner of selecting iron and steel for a given purpose is by natural selection." That is, carefully examine into the properties and qualities of metals as to their economic usefulness and safety.

Mr. Adamson evidently had the fact in his mind that our knowledge of the properties of metals is not yet sufficiently advanced to permit us to draw conclusions from one property of a metal as to the presence, degree and usefulness of the other properties. Having learned to appreciate the wisdom of Mr. Adamson's remark quoted above, the writer has endeavored, in his articles on "The Flow of Metals and Its Relation to Testing," to call attention to a field of investigation which thus far has been somewhat neglected. Too much importance has been attached to the effects only of this phenomenon, a proceeding which has a tendency to lead to wrong conclusions, since the effects of the flow of metals are modified or intensified, as the case may be, by local conditions. These manifest themselves most strongly in contraction, less so in the results of strength and elongation.

PERSONALS.

C. E. Irwin, for some years secretary of the LaBelle Iron Works, of Wheeling, W. Va., has resigned his position, and has been succeeded by John Wright, head bookkeeper for the firm. It is stated that Mr. Irwin will leave Wheeling and engage in business in some other city.

W. B. Garrett has been elected secretary of the South Pittsburg Pipe Works, at South Pittsburg, Tenn., Mr. Moore, the former incumbent of that position, having resigned on account of ill health.

G. G. Brown, formerly of Crozer Iron Works, Roanoke, Va., has accepted the position of foundryman of the Salem Iron Company, Salem, Va.

F. K. Warren, assistant superintendent of the Woodstock Iron Company, at Anniston, Ala., recently resigned that position to accept a similar one in Syracuse, N. Y.

Howard F. Martin, of Bridgeport, Conn., has accepted a position with the Pennsylvania Steel Company, at Steelton, Pa.

An important conference will take place at Washington, November 12, between representatives of the Treasury Department and prominent railroad officials respecting the bonding, sealing and manifesting of goods passing over the Canadian boundary. The traffic through the International tunnel at St. Clair River is one reason for desiring a better understanding of trade relations between the two countries. The interests of the Canadian Pacific would be decidedly involved if the suggestions should be carried out which were hinted at in the report of Senator Cullom upon the Canadian railway question and in the communication sent to Congress by Secretary Windom early in August. The discussion is likely to hinge upon the question of keeping open the short routes across Canada between New England and the West.

Senator Hale, of Maine, Geo. B. Loring, late Minister to Portugal, and several others addressed the Boston Boot and Shoe Club last week in advocacy of Secretary Blaine's reciprocity relations with Southern America. It was argued that Boston, although no longer the leading commercial city, may do much to recover her position by opening new markets. New England's sale of manufactured products is but 60 per cent. of the power to produce. The two shipping bills before Congress go hand in hand with the reciprocity movement.

Monarch Magnetic Separator.*

BY C. M. BALL, TROY, N. Y.

The magnetic concentration of iron ores has been so often and so widely studied and discussed among the members of the Institute that any remarks concerning its general importance, from an economic standpoint, would be superfluous; but it is thought that a description of the Ball and Norton ore separator, designed for cobbing and separating magnetic iron ores, indicating its essential differences from other machines and the advantages claimed for it, together with some account of recent results obtained in its application to the concentration of such ores, will prove of interest. This machine is the joint invention of Mr. Sheldon Norton, of Hokendauqua, Pa., and the writer, and has been patented in the United States, Canada and other countries.

Of the accompanying illustrations, Fig. 1 represents a longitudinal vertical section of the perfected Monarch ore separator, adapted for separating fine ore, and Fig. 2 the same, adapted for cobbing ore of the size of stove or chestnut coal. The two designs are identical in principle, and vary from each other in minor details only. The apparatus consists of a partially closed chest, having an opening at *f*, from the feed hopper, *h*, through which the ore is delivered to the machine from an ore pocket or storage bin provided with means for regulating the flow of ore, so that, when the machine is in operation, the hopper is kept always full. Other openings are provided for the discharge, at *t*, of tailings; at *m*, of middlings, and at *c*, of concentrates; also, at *e*, for allowing free ingress of air to the chest at that point, and at *s*, where a powerful exhaust fan is connected. The openings at *t* and *m* are kept sealed against ingress of air at those points by means of the hinged and weighted valves, *v*, *v*, which discharge the products from the hoppers *p* and *k* continuously, and in the same proportion as received from above, when a sufficient weight has accumulated upon the inside to cause the contents of the hoppers to leak by the valves.

The machine is also provided, as shown, with two drums, Nos. 1 and 2, turning upon the shafts, *i* and *j*. These shafts, together with the magnets *a* and *b*, which they also serve to support, stand still, while the drums may be rapidly revolved around the magnets and out of contact therewith. It will be noticed that the magnet occupies a section of the drum, the proportions being such that, approximately, one-third of the periphery of the drum is within the influence of the magnetic field, while the upper two-thirds is outside of the field and removed from the magnetic influence. The magnet is so constructed as to present a series of poles of alternately opposite polarity near the inner surface of the drum. In accordance with the well known phenomena of magnetic attraction, which in the case of powerful magnets is exerted at a considerable distance from the magnetic poles, any magnetizable matter brought near the outer service of the drum, within the arc covered by the magnet, will be powerfully attracted and drawn into firm contact with the outer surface of the drum. These drums are composed of a non-metallic and neutral material, such as wood, paper, &c., and they turn in the direction indicated by the arrows near the top of the drums.

Just below the feed hopper an apron of neutral metal, No. 3, is arranged, curving downward and forward in the direc-

tion of the rotation of the drum, its lower portion describing a short arc concentric to the surface of the drum. This serves as a chute to direct the stream of ore falling from the feed hopper within the influence of the first two or three poles of the magnet. A similar but somewhat shorter apron, No. 4, is arranged in like relation to the second drum and magnet *b*. Attention is called to the provisions for applying and directing the air current, which fulfills an important function in the process of separating ore as developed in this apparatus. The air may enter freely at the openings *c* and *e*, and is drawn through and out of the chest by the action of a powerful exhaust fan connected at *s*. The air which passes through the chest containing the drums and magnets must, of necessity, follow the course indicated by the arrows in the space below the drums.

When the machine is put in operation the magnets are excited, the drums are revolved in the direction before indicated, the air current is established through the machine in a direction opposite to that of the rotation of the drums, and ore is supplied through the feed hopper which is kept always full. The ore passes down

along, they again stand on end—but this time the other end out. So, in passing through the magnetic field, they are tumbled end over end as many times as there are poles in the field. The result is, that every time they are reversed in position opportunity is afforded for any non-magnetic particles of gangue, which may have been entangled with the ore, to fall away from the tufts of magnetite; and this result is still further facilitated by the centrifugal tendency and by the counter current of air.

When the ore reaches the limit of the arc covered by the magnetic field it is no longer attracted, and takes on a tangential movement, which carries it away from the drum. It has now, however, passed the edge of the second apron, and, on leaving the first drum, comes within the influence of the magnet of the second drum, where similar operations are repeated, a portion being finally discharged as concentrate at *c*. The function of the second drum and magnet being to differentiate the product from the first drum into two portions, which may be conveniently designated a middlings, discharged at *m*, and concentrate, discharged at *c*. The middlings con-

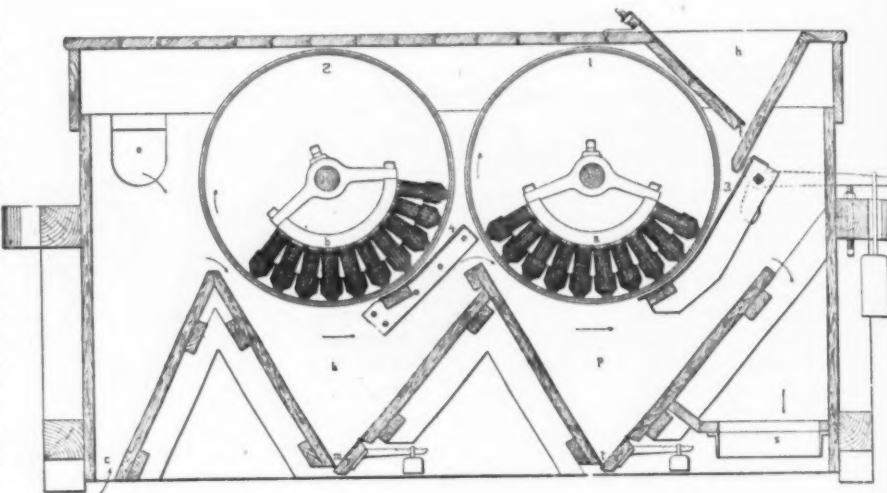


Fig. 1.—Longitudinal Vertical Section of Monarch Magnetic Machine for Separating Fine Ore.

the chute under the first drum, and, as soon as it comes within the influence of the magnet, the magnetizable portions are drawn into contact with the drum and through friction upon its surface take on the forward movement of the drum. At this stage a curious and important result takes place. In accordance with the well known laws of magnetic induction, a particle of iron brought near a magnet itself becomes a magnet by induction, and the magnetic force tends to bring the longer axis of this induced magnet into a position as nearly as possible parallel to the direction of the magnetic force. So a single particle, or many particles, brought near one pole of a magnet stand on end, as it were; and, in the case of many particles simultaneously influenced by the same pole, they form tufts standing out from the pole, their outer ends repelling each other, but all pointing in the direction of the lines of force toward some focus of opposite magnetic polarity. In conformity with this law the particles of ore in contact with the drum opposite one of the poles of the magnet stand on end, forming tufts, spreading away from each other at their outer ends. As they are drawn along, however, by friction against the moving drum, when they get to a point midway between two poles they lie down flat against the surface of the drum, and, as they are drawn still further

sist of particles of ore, with adhering portions of gangue, which may require a little finer crushing to effect their mechanical liberation; or they may consist in part of iron compounds having a smaller degree of magnetic susceptibility than the pure magnetite. The separation of the middlings from the mass delivered to the second drum may be effected in two ways: If the drums have the same speed of rotation, a weaker magnetism in the second magnet will allow these less magnetic particles to drop away; or, if the magnets have approximately the same force in the two drums, a higher speed of rotation of the second drum will throw these particles off by reason of the centrifugal force overpowering the centripetal magnetic attraction, the magnet having the smallest influence upon the leaner portions of the mass.

The peculiar action of the ore in passing through the complex or multipolar magnetic field has already been described. Upon the mode of arrangement of the poles the efficiency of the apparatus largely depends. In this machine the magnetism of the field of attraction performs a two-fold function—namely, to attract the magnetizable matter of the ore, and, as it is moved through the machine by friction upon the revolving drum, to turn it over and over so as to allow the gangue to fall away, and also to permit the air current to take effect on all sides of every particle of

* Abstract of paper presented at the New York meeting of the American Institute of Mining Engineers, September, 1890.

the ore. If the importance of this operation is once recognized, it will be readily understood that there can be only one possible efficient arrangement of the poles, and that it is not a matter of indifference whether they conform to this or some other plan.

The positive character of the functions above enumerated renders it possible to make an effective separation under the conditions of a very heavy supply of ore to the machine. The easy working capacity of a machine having drums of 24 inches diameter and 24 inches working face is from 15 to 20 tons per hour of ore granulated to pass 16 to 20 mesh screens. The power required is from 1 to 1½ horse-power in electricity for each drum, and ½ to ¾ horse-power to drive the machine. These machines have been applied to the treatment of a considerable number of ores. The most remarkable of these was the conversion of Port Henry Old Bed ore into a Bessemer ore, carrying Fe 71.10, P 0.037. This concentration was made from the crude ore, carrying Fe 58.7,

usual dearth of skilled mechanics and small margin of profit, owing to strong competition, was one of the unfavorable conditions presented.

Twin Screw Armored Ram.

Plans have been completed by the Board of Construction and Repair, Navy Department, for a twin-screw armor-plated harbor defense ram on the design of Rear-Admiral Ammen, authorized by act of Congress March 2, 1889. The principal features are:

Length over all.....	243 ft.
Length on load water line.....	242 ft. 9 in.
Breadth, extreme.....	43 ft. 5 in.
Breadth on water line.....	41 ft. 10 in.
Draft amidships.....	15 ft.
Displacement.....	2,050 tons.
Indicated horse power.....	4,800 tons.
Speed.....	17 knots.

The vessel is designed on the longitudinal and bracket system, with an inner bottom extending from the collision bulkhead to the stern. The longitudinals and

in thickness, and the lower 3 inches, to be secured by bolts with countersunk heads, driven from the outside through wood backing of yellow pine and two backing plates each 20 pounds per square foot, and set up with nuts on rubber washers. All hatches through the armored deck are to have battle plates, and the smoke pipe and ventilators to have inclined armor 6 inches in thickness. The conning tower is to be 18 inches in thickness.

The ward room is on the after berth deck just abaft the engine room bulkhead, into which open seven staterooms and a pantry. Aft the officers' quarters is a berthing space for part of the crew, the forward berth deck being designed entirely for the crew. The engines are triple expansion, and of the horizontal type, each engine being in a separate compartment. There are four cylindrical horizontal fire-tube boilers, placed in two water tight compartments. The engines are to develop 4800 horse-power, under forced draft, with a corresponding speed of 17 knots. There is to be a complete installation of

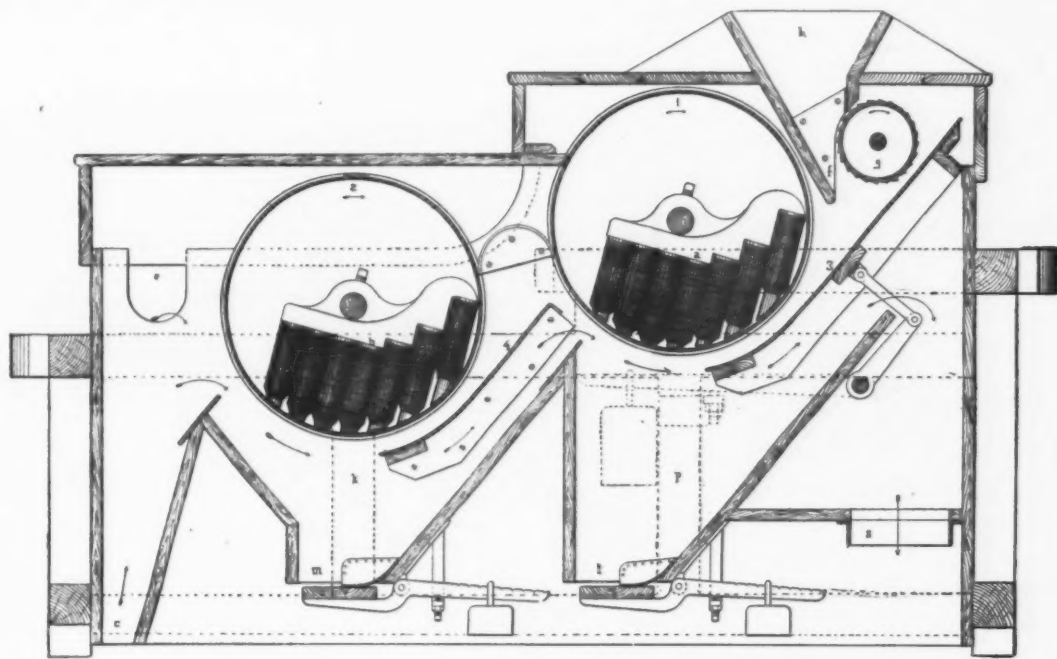


Fig. 2.—Monarch Machine Adapted for Cobbing Ore the Size of Stove or Chestnut Coal.

P₂O₅ 2.25, the Bessemer concentrate representing about 65 per cent. of the original mass.

An earlier type of this machine was in use during nearly the whole of the year 1889, at Benson Mines, St. Lawrence County, N. Y., concentrating the lean magnetite mined there, which in the crude ore carries about 40 per cent. Fe, and is above the Bessemer limit in both phosphorus and sulphur. The concentrated product found a market at Pittsburgh, Pa. The new works at this mine are provided with crushing machinery having sufficient capacity to crush daily 800 to 1000 tons of ore, sized to 16 mesh and finer, and the separation of this quantity of ore is to be effected at the outset with three separators of the type represented in Fig. 1, having a working face on the drums of 24 inches.

Fully 200 carriage manufacturers displayed their wares at the annual convention of the association at Chicago. During the past year, the report stated, over 400 factories, several of mammoth proportions, have been erected. Increased demand from foreign markets has given to the trade a desirable impetus. An un-

girders supporting the deck are to be continuous, converging to the stem casting and to the stern, the frames and beams to be intercostal; the depth of longitudinals and vertical keel throughout their length to be 24 inches, the girders supporting the armored deck to be 15 inches. The vertical keel, two longitudinals and armor shelf on each side of the vertical keel are to be water tight, forming transversely six compartments, these being divided longitudinally by water tight frames. By this means the space between the inner and outer skin is subdivided into 72 compartments. The transverse and longitudinal bulkheads between inner skin and deck armor divide this space into 30 compartments, making a total of 102 compartments in the vessel. The vessel is to be provided with a removable wrought steel ram head, to be accurately fitted and securely held in position in the cast steel stem.

The outside strake of the deck armor is to be 6 inches in thickness, the next strake inboard to taper in thickness in its breadth from 5½ to 2½ inches, the remainder of the deck plating to be 2½ inches in thickness, including the lower course of plating. The side armor is to be two strakes in depth, the upper 6 inches

electric lights sufficient for lighting all parts of the vessel, and arranged in duplicate so as to guard against accident. The drainage system is so arranged that any compartment can be pumped out by the steam pumps. The vessel is to be submerged to fighting trim by means of valves, one in each transverse water tight compartment of the double bottom; and sluice valves are to be fitted in the vertical keel and the water tight longitudinals in these compartments. The only projections above the armor deck are the conning tower, smoke-pipe, ventilators, hatch combings and skid beams, on which the boats are supported. The vessel has no armament and is to rely entirely on the ramming for her offensive power.

A survey of the Hudson River will be made by three army engineers, with the object of making the river navigable to Albany by vessels drawing 20 feet of water.

The large amount of freight passing between ports in California and ports in Mexico and Guatemala has attracted capital sufficient for the establishment of a line of steamers to and from San Diego.

Notes on Recent Improvements in German Steel Works and Rolling Mills.*

BY R. M. DAELEN, DUSSELDORF, GERMANY.

In recent years many new appliances have been introduced into German steel works and rolling mills for the purpose of improving working methods, creating and

been noticed, the cause of their survival must be attributed to the greatly increased consumption of all kinds of iron manufactures. Several large new works for the production of ingot iron are now, however, in course of erection in the Rhenish-Westphalian district, and upon their completion a rapidly diminishing output of wrought iron may be anticipated.

The present aim of all large works manufacturing ingot iron is to work the

of works possessing both a converter and an open hearth plant are now endeavoring to arrange them for combined working, both in charging and in casting. In small works the basic lined reverberatory furnace is constantly gaining ground over the old puddling furnace. The small basic converter, on the other hand, has been erected at only a few places and is in actual operation at fewer still.

Opinions have long differed with regard to the best number and arrangement

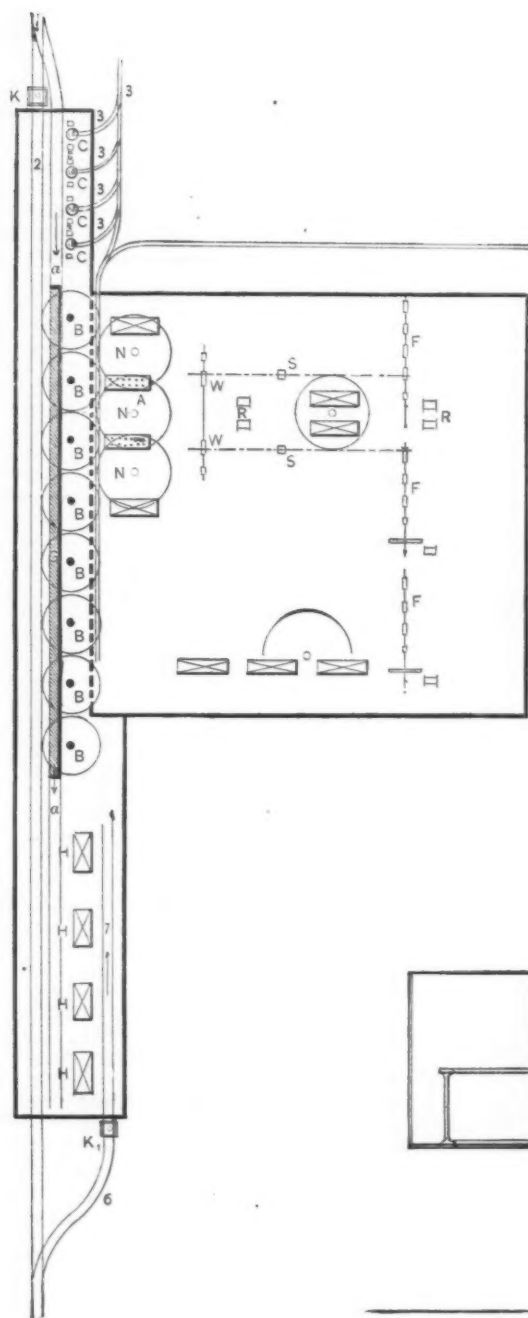
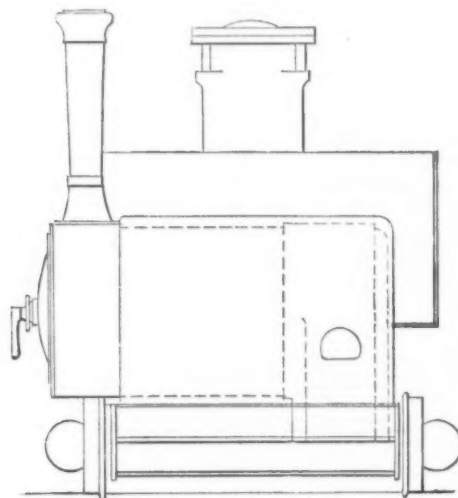


Fig. 1.—General Plan of a Combined Converter and Open Hearth Works.



**Fig. 4.—Elevation of Locomotive End of 12-Ton
Ladle Crane.**

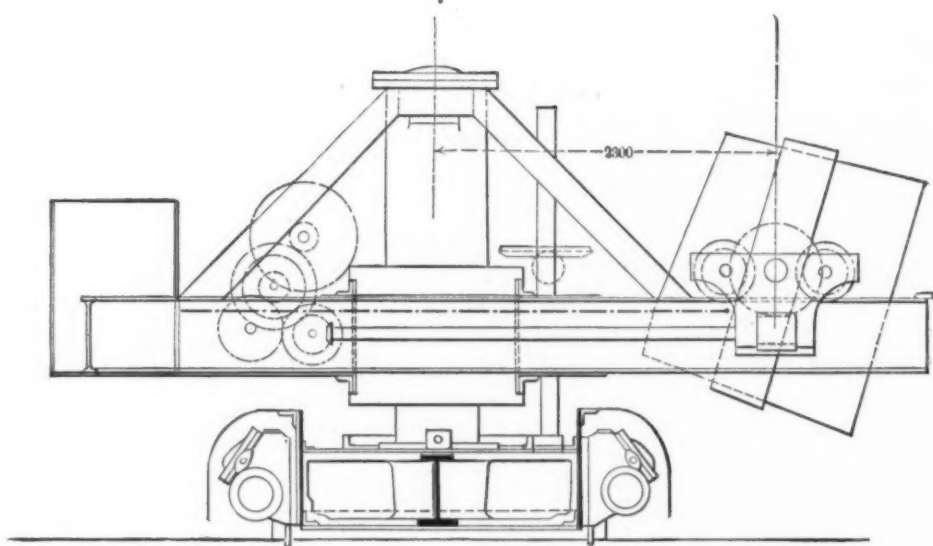


Fig. 5.—Elevation of Crane End of 12-Ton Ladle Crane.

maintaining increased production, and satisfying the ever growing demand for metal of closely specified hardness, strength and form. A result of the improvements has also been to aid most effectively in demonstrating the real superiority of ingot over wrought iron for almost every possible purpose, and in dispelling the last vestiges of prejudice unfavorable to the new metal.

If, nevertheless, no marked decrease in the number of puddling furnaces has yet

molten blast furnace pig into a finished product without any further fuel consumption than is required to furnish steam for the rolling mill. Though practice has established the feasibility of this principle, no works can yet point to its complete adoption, partly because of the limitations imposed by existing conditions and plant, and partly, also, on account of the highly diversified character of the finished products.

The Bessemer works were the first to feel the influence of the basic process, but of recent years a similar influence has affected the open hearth, and the owners

of basic converters for a given daily production. These varying views are to be partially explained by the rapidly improving efficiency of basic practice. The number of heats per day and the durability of the lining were, in the early days of the process, far inferior to the corresponding features of acid practice, and the improvements which experience has gradually developed are such as could scarcely have been anticipated.

The system of removing and replacing the entire vessel has been adopted in isolated cases only. As soon as the fact seemed fairly well established that three

*Presented at the New York meeting, September, 1890, of the American Institute of Mining Engineers.

10 to 12-ton basic vessels would suffice for a daily production of 400 to 500 metric tons, the circular arrangement of the vessels around a stationary revolving ladle crane was recognized as simplest in general plan, and was carried out in a number of works. Wherever this crane handles the charging ladle and also has to carry the steel ladle while the metal is being poured from the converter separate provision must be made for handling the steel ladle during the cast. This may be done

Since, however, the advantage of emptying the charging ladle by tapping, rather than by tipping, has come to be recognized, another arrangement would recommend itself, namely, the providing of each pair of converters with a hydraulic lift, placed between them. This arrangement exists in several works outside of Germany. It permits short runners (which would have to be provided for tapping in any case), and does away with the upper charging track altogether.

the vertical movement of the ladle, which experience has shown to be superfluous; and, instead of being propelled by steam, it is moved by means of a hand gear *u*, or by an independent locomotive (which runs on the adjoining track No. 2, shown in the general plan, Fig. 1). The car is of wrought iron. The ladle can be tipped, as shown at *n*, and swung in the arc *o*, to serve two lines of molds. During casting the car is always moved in the direction *m*, so as to clear the filled ingot molds.

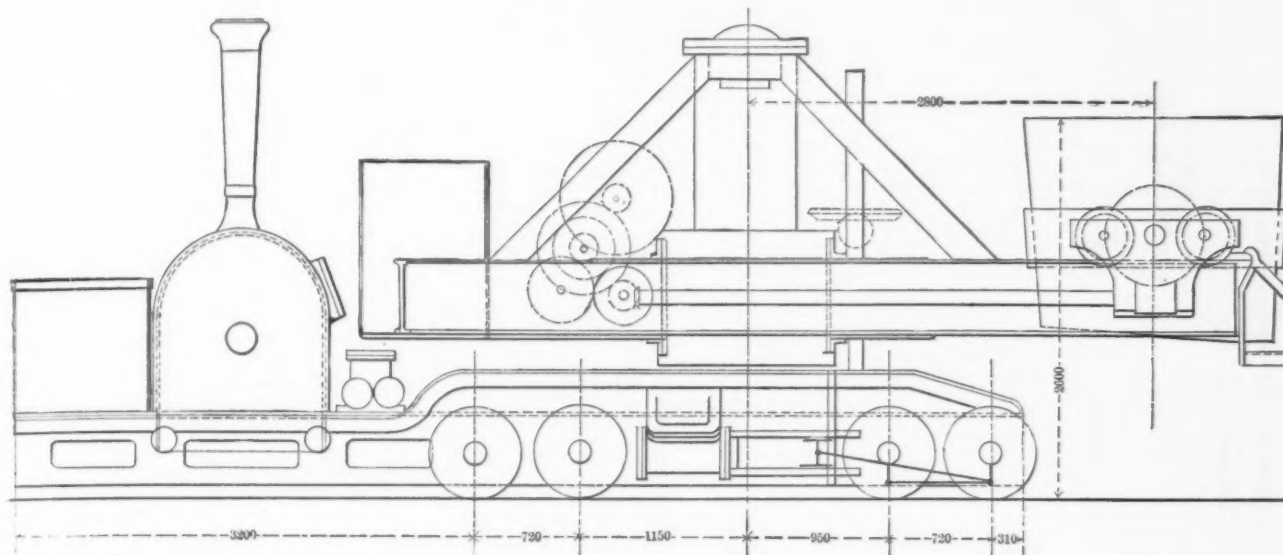


Fig. 2.—Side Elevation of a 12-Ton Locomotive Ladle Crane.

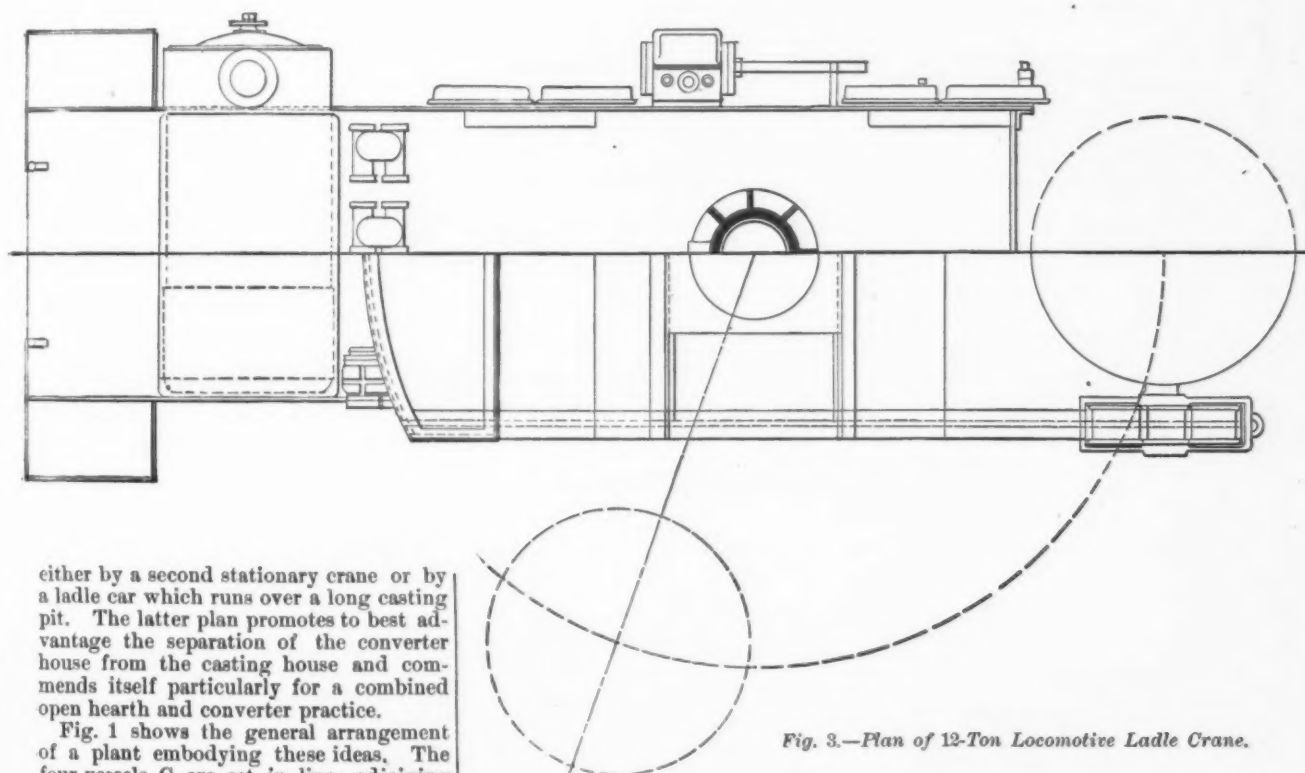


Fig. 3.—Plan of 12-Ton Locomotive Ladle Crane.

either by a second stationary crane or by a ladle car which runs over a long casting pit. The latter plan promotes to best advantage the separation of the converter house from the casting house and commends itself particularly for a combined open hearth and converter practice.

Fig. 1 shows the general arrangement of a plant embodying these ideas. The four vessels *C* are set in line; adjoining them are the casting pit *G* and the ingot cranes *B*, and beyond these, in the same direction, the open hearth furnaces *H*. The ladle of direct metal is brought by track No. 1 on the general floor level to the hydraulic lift *K*. There it is raised to the charging level of the converters. The track at this level may be laid either on the crane or on the chimney side of the vessels. In the former position the supports of the track partially intercept the view of the vessel's mouth from the pulpit during the operation of pouring; in the latter position long runners for the pig metal are unavoidable.

Track No. 1 on the general level then serves with the necessary switches for the movement of both the pig and the steel ladles.

The design of the steel ladle car has usually been determined by local conditions. A locomotive crane, Figs. 2 to 5, is the customary type; the boiler, engine and pump are all mounted on the car, and the ladle is arranged to be swung and also lifted. A somewhat simpler, and on this account preferable, form of car is illustrated in Figs. 6 to 10. It dispenses with

Care is taken to bring the tops of all the molds to the same level.

A hydraulic cylinder is placed in the pit, out of the way of the molds, and is fitted with a hooked plug which is used to force inward any obstruction that may form in the tapping hole of the ladle.

Track No. 3, Fig. 1, is used to convey the slag cars from beneath the converter to the slag grinding mill. Refractory materials are brought to the vessels over track No. 4, located on the first platform, Figs. 12 and 13. Lime and fuel are sup-

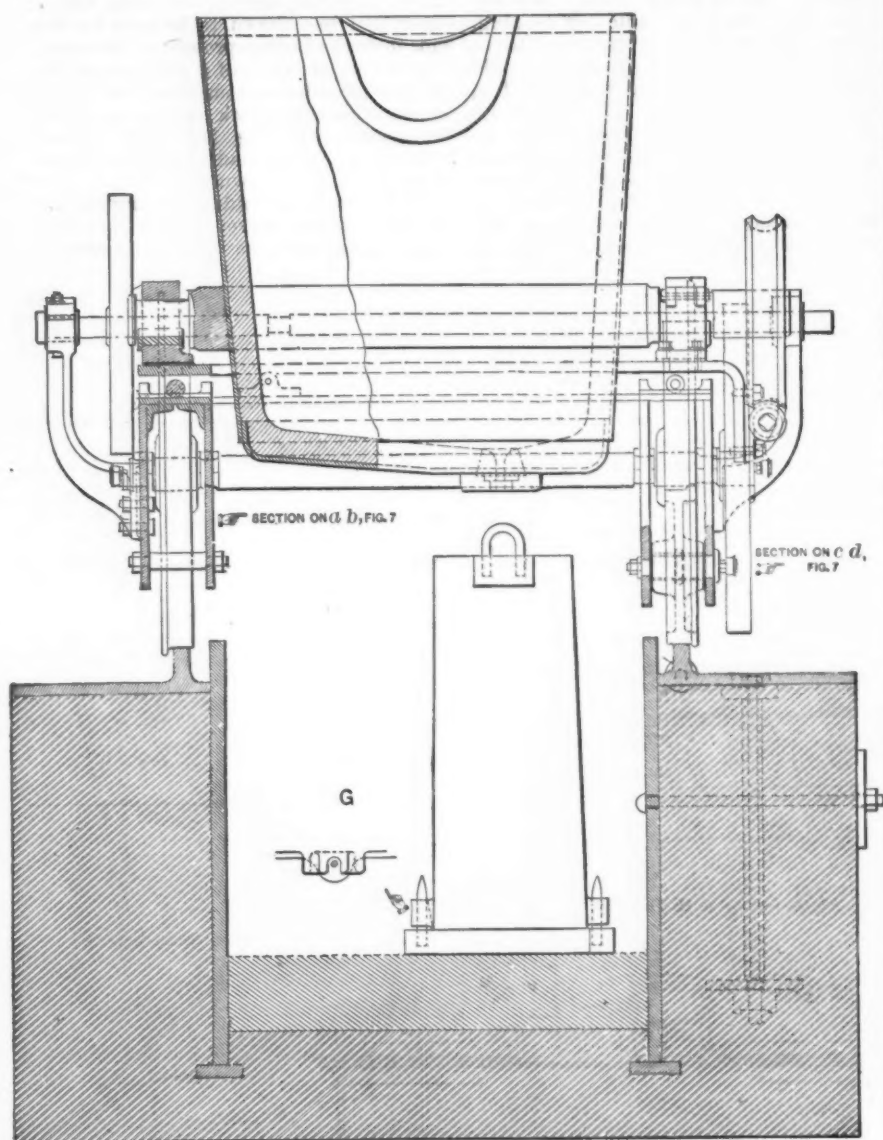


Fig. 6.—Elevation and Vertical Half Section of 12-Ton Casting Ladle and Car.

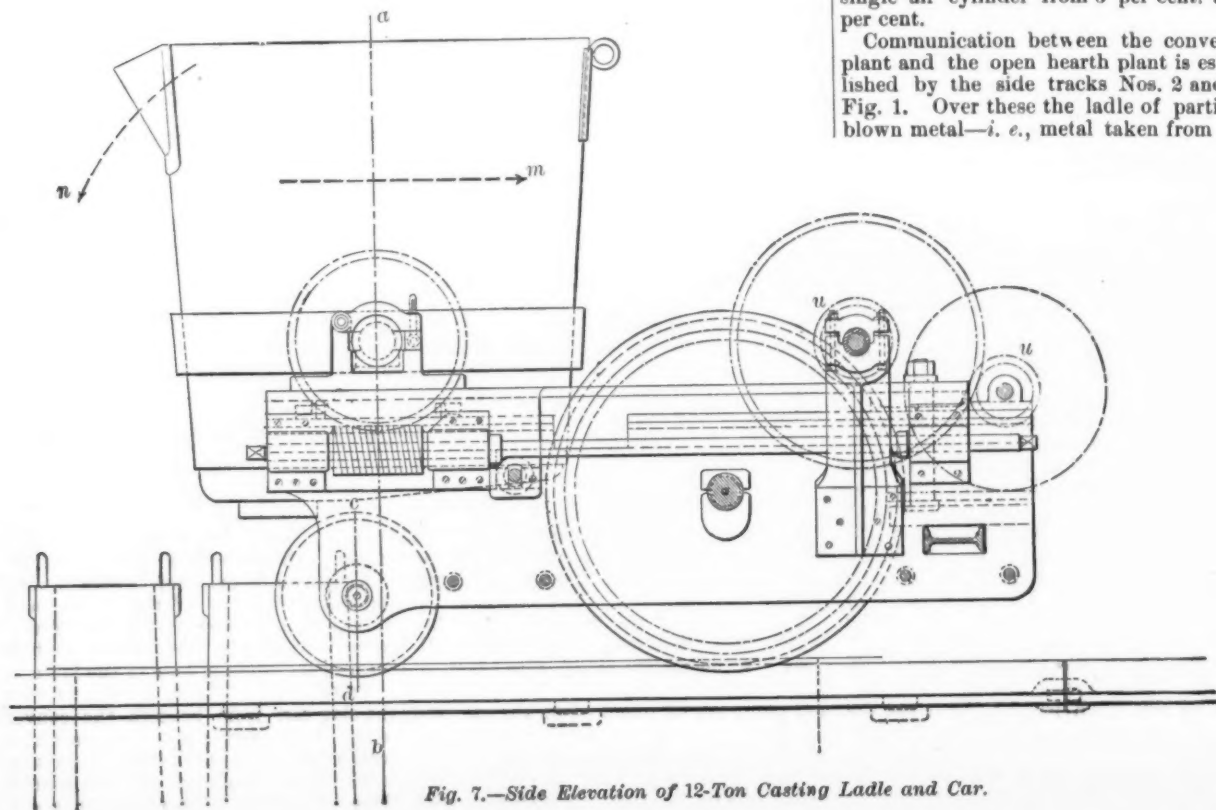


Fig. 7.—Side Elevation of 12-Ton Casting Ladle and Car.

plied by track No. 5 in the roof truss. Both tracks, Nos. 4 and 5, are served by a hydraulic hoist, A, Fig. 12. The same service might be more cheaply performed by a wire rope tramway, the first cost of which is certainly less than that of the track and hoist, while it offers the decided advantage of an automatic lime and coke supply to the converters.

For a plant embodying the above described general features, a building of moderate height will answer. The roof can be set so low that the greater part of the converter flame will be carried off on the outside, reducing interior smoke and heat to a minimum. This makes it practicable with advantage to adopt the same form of roof for both the converter and the casting house.

In the construction of the converter itself the use of a middle ring and journal, made in a single piece, has been generally abandoned; for when it is composed of cast iron, even though it be very heavy, it is not perfectly safe, and when made of wrought iron it is very costly. The ring is now constructed of heavy plate, to which cast steel journals are screwed.

Tar-silomite bricks, made in a hydraulic press, have proved an excellent material for the basic lining. Walling up with them occupies much less time than ramming, while their durability is not inferior. Mechanical appliances have also been successfully employed in making the bottoms.

The utilization of converter slag as a fertilizer is an important business for every basic works. The substitution of a ball pulverizer for the Chili mill marks a decided improvement. The new machine costs less and consumes less power, besides permitting without difficulty the far more thorough removal of the dust which works through its casing.

The cause of the great progress which has been made in increasing the output of the basic converter lies, first and foremost, in the gradually reduced period of the blow. The former duration of 20 minutes for 10-ton converters has been brought down to 12 minutes. The excess of blast, which formerly amounted to 150 per cent., is now about 30 per cent. Great improvement of design is noticeable in the air compressors, the effect of which has been to reduce the lost space at one end of a single air cylinder from 5 per cent. to 2 per cent.

Communication between the converter plant and the open hearth plant is established by the side tracks Nos. 2 and 6, Fig. 1. Over these the ladle of partially blown metal—i. e., metal taken from the

converter before the completion of the after blow, is brought to the lift K_2 , by means of which it is raised to track No. 7, on the charging floor, where it is tapped through a short runner into the open hearths.

The requirements of the basic lining have led to material improvements of the Siemens regenerative furnace. Hearth, flues and regenerators are now made independent, in order to secure the greatest possible accessibility for rapid repairs. These changes have made it practicable to enlarge the regenerators and design them in a more rational form. As a result, higher temperatures have been obtained with exceedingly economical fuel consumption, and the duration of each heat has been reduced with a corresponding increase in daily output. Six 12-ton charges, each consisting of 8 tons of pig and 4 tons of scrap, are now run in 24 hours, with a fuel consumption of 300 kgs. of coal per metric ton of ingot iron of the softest quality.

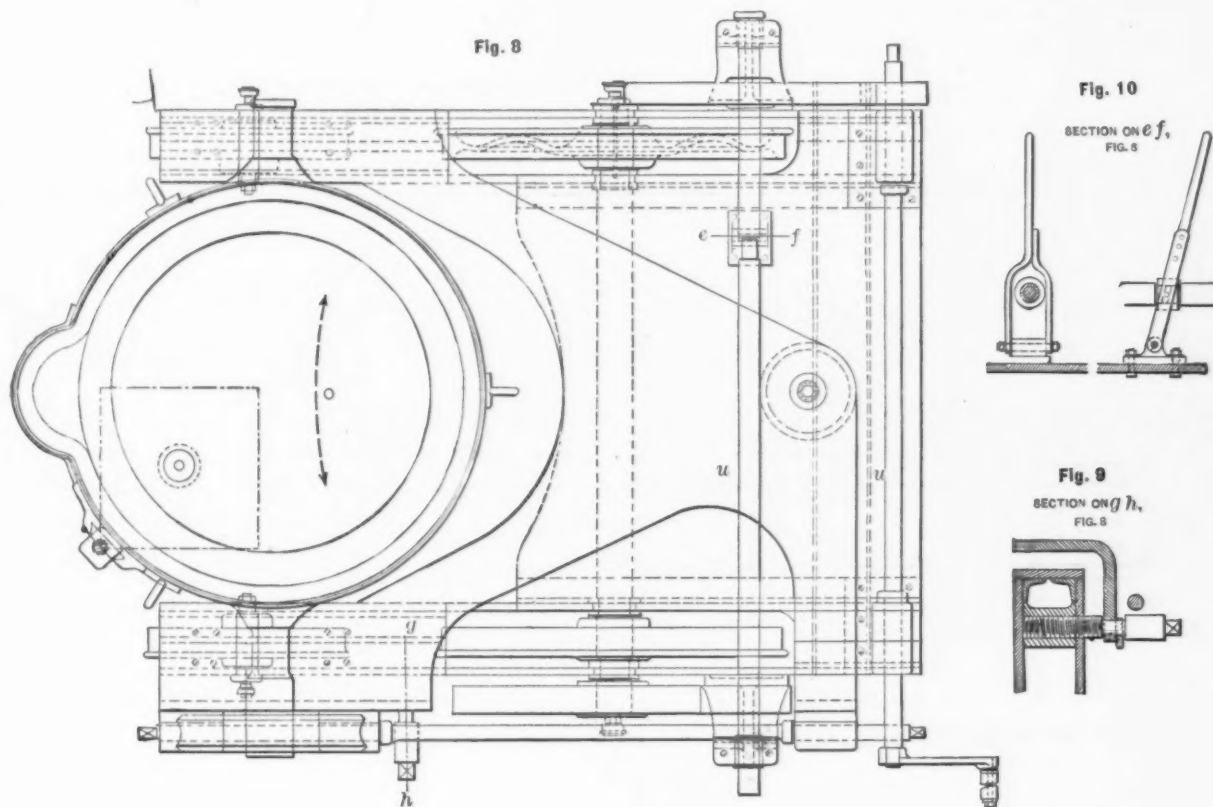
product. To maintain these conditions, not only a close and careful control of the various processes is necessary—which is in itself an advantage to any establishment—but the construction, arrangement and proportioning of all departments must be exactly adapted to the needs of continuous running. Since this is seldom the case in existing works, which have been more or less remodeled in single departments and retain many antiquated features, the introduction of soaking pits may be delayed in these until complete reconstruction has become imperative.

The number of the plain (unfired) pits is so adjusted that ingots of 1000 to 1500 kg. may remain in them 40 minutes. The loss of metal by oxidation during soaking and rolling, taken together, amounts to 1 per cent. The fired pits are provided with either gas firing and regenerators, or with grates and air heating. The consumption of coal is $2\frac{1}{2}$ to $3\frac{1}{2}$ per cent., and the loss by oxidation $1\frac{1}{2}$ to 2 per cent.,

cause they are subject to breakage of their motive parts due chiefly to the frequent and sudden reversals of motion to which they are subjected. It is, therefore, advantageous to operate these feed rollers by belt transmission, because this gives a lower initial velocity at every reversal than does a directly applied reversing engine.

Of the reversing engines, R, which drive the rolls, various designs are in use. That which combines a vertical and horizontal cylinder has the advantage of conveying all the power through a single straight shaft; but engines with three horizontal cylinders have lately been adopted in many quarters, because calculations show that they can be run with a higher degree of steam expansion in the cylinders.

Blooming mills are employed chiefly in the production of blooms for rails, shapes and billets. For the plate mills it is more customary to use bottom cast ingots from narrow plate molds.



Figs. 8, 9 and 10.—Plan of 12-Ton Casting Ladle and Car.

In the instance here illustrated, the casting house is common to both converter and open hearth plant, and forms the connecting link for both with the soaking pits A, the blooming mill, W, and the finishing mill, F. Soaking is carried on upon a large scale, especially in plain (unfired) pits. This system is continually extending in practice. It is particularly adapted to the working of the blooming mill, because it permits the use of very heavy ingots of uniform size, and thus simplifies the work of the casting department. Moreover, since the further reduction of the blooms without wash heating to $\frac{1}{10}$ or $\frac{1}{15}$ of the original cross section has been proved practicable, the soaking pits effect in that direction also important savings, and it is to be expected that they will find general use likewise in connection with the products of finishing rolls, such as rails, ties, &c.* The plain pits require for their successful operation a regular running of the steel works with a large

* In the rolling of rails from 15 x 15-inch ingots, the cross section is reduced to about 1-40.

while a heating furnace consumes 5 to 6 per cent. of coal and causes $2\frac{1}{2}$ to 3 per cent. of loss by oxidation. At the same time the service and the maintenance of the pits are less expensive. They are served by the cranes N, all the motions of which are controlled by hydraulic pressure. Of these hydraulic cranes, which have many advantages over the simple lever cranes, there are various designs in use.

The blooming trains are mostly two-high and driven by reversing engines. The diameter of the rolls has increased from 900 to 1100 mm.; those of the last named size being capable of reducing the ingot diameter $\frac{1}{4}$ at each pass, when the driving machinery is adequately heavy. For this work the engine, using 75 pounds steam pressure, has a cylinder diameter of 1300 mm.; stroke, 1500 mm., and a reduction by gearing of 1 : $2\frac{1}{2}$ or 1 : 3, so that the number of revolutions per minute is 120 to 130.

The feed rollers for moving the ingot before and behind the blooming rolls need special care in construction, be-

The bloom shears, S, Fig. 1, are represented by many different designs, and are provided with horizontally or vertically acting blades, according to their special work. Most of them are operated with hydraulic pressure (up to 500 atmospheres), which is furnished, for the sake of simplicity, by a steam jack close by the shears. This consists of a vertical steam cylinder with single acting piston, on which the steam presses from below, the upward prolongation of the piston rod constituting a water plunger in a smaller cylinder, where the pressure is, of course, in the inverse ratio of the two plunger areas. The high water pressure works upon the pressure plunger of the shears, and, after the cut is ended, the water returns into the smaller cylinder. It may be remarked, in passing, that this system is much used for hydraulic presses and lifts in metallurgical works, because it dispenses with the accumulators, long conducting pipes and valves under heavy hydraulic pressure, which are so difficult and costly to maintain, when hydraulic power

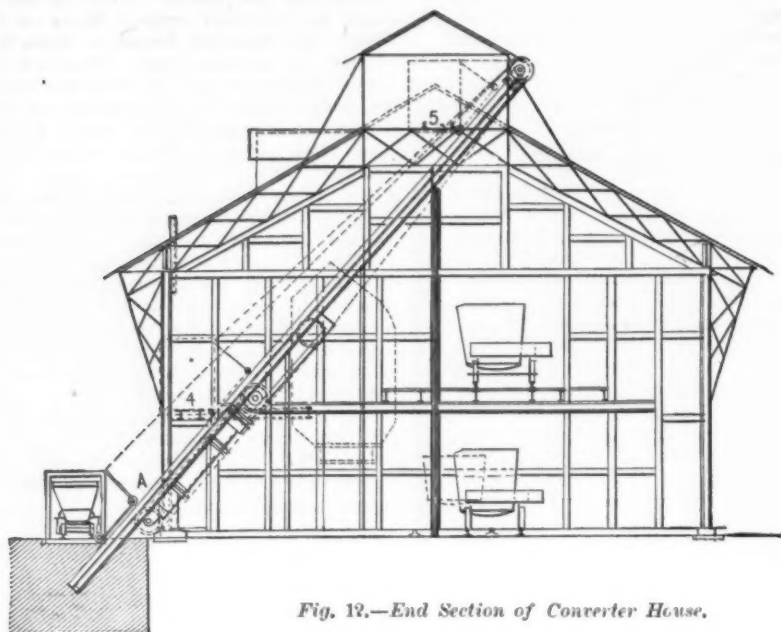


Fig. 12.—End Section of Converter House.

ceive each a cogged gearing, by means of which they can be operated by a workman standing on the floor at the side of the housings. Such a three-high train requires but three sets of rolls, while a reversing two-high train must have five sets in order to roll, from blooms, I-beams up to 400 mm. in height. In view of the large product of 300 to 400 metric tons per day, the larger number of workmen required for the three-high mill is less important than the larger consumption of steam for running the two-high. The movement of the pieces to be rolled takes place wholly upon hand levers, which are connected with a steam lift, so that the trains of feed rollers before and behind the mill, which are so expensive to install and to maintain, are dispensed with. It is, therefore, easy to understand that the three-high form is decidedly preferred for rolling mills, and that the two-high is resorted to only when the dimensions of the product require it.

In the manufacture of plates, the three-high mill with loose middle roll (Lauth's system), is largely used, especially in preliminary rolling for the sheet mills. For the production of heavy plate (boiler plate, &c.), the following dimensions are employed in one establishment: Diameter of rolls, 900 mm.; length 3400 mm. The

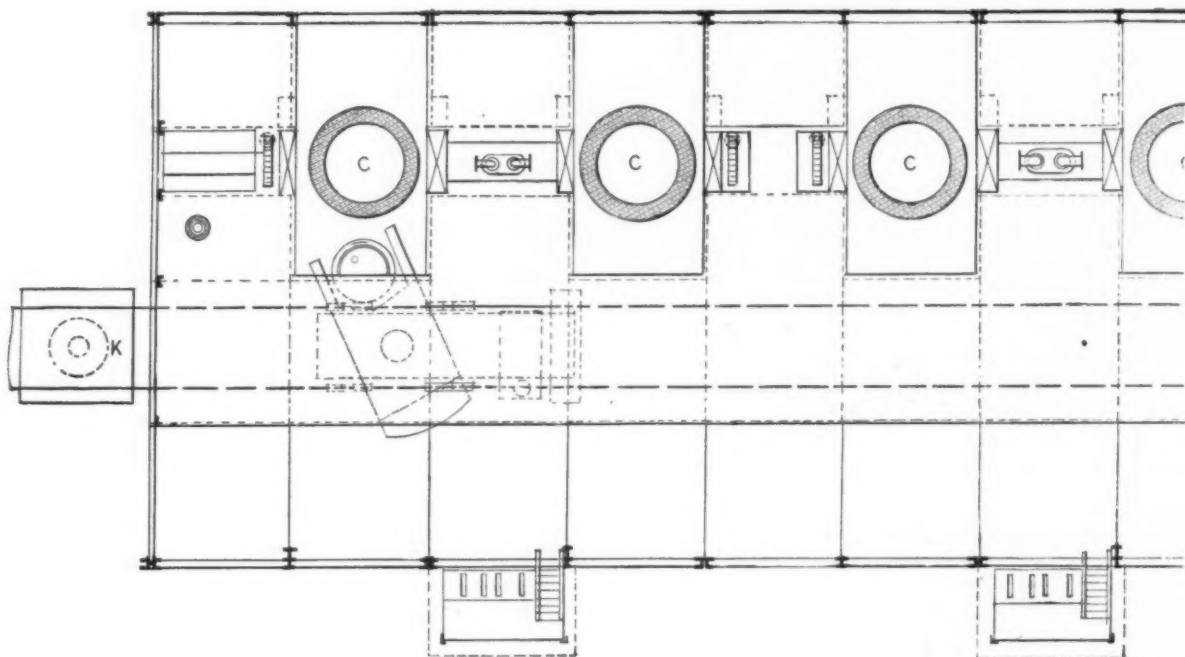


Fig. 11.—Plan of Converter and Casting Houses.

is derived from steam pumps in the old fashioned way.

After many experiments, this construction was at last made practicable only by means of an arrangement for regulating the speed of the steam piston by that of the water. In this way a considerably higher number of strokes per minute has been attained than is the case with shears driven by rotary motion. This number ranges up to 25 strokes per minute. The beginning of the cut is determined by the operator, so that the danger of waste by cutting too short is avoided.

For the further reduction of the blooms to rails, ties and shapes, three-high rolls are very generally used. The diameter of the rolls ranges up to 800 mm., which is sufficient for the rolling of ingot iron I-beams 400 mm. high and 16 meters long.

In these operations the most approved form is the three-high mill with fixed middle roll, and upper and lower rolls adjusted both horizontally and vertically. The upper and lower pressure screws re-

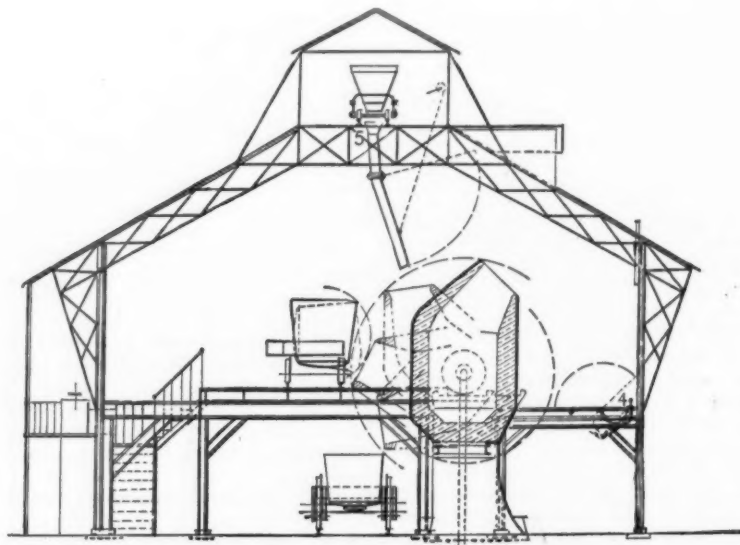


Fig. 13.—Cross Section through Converter House.

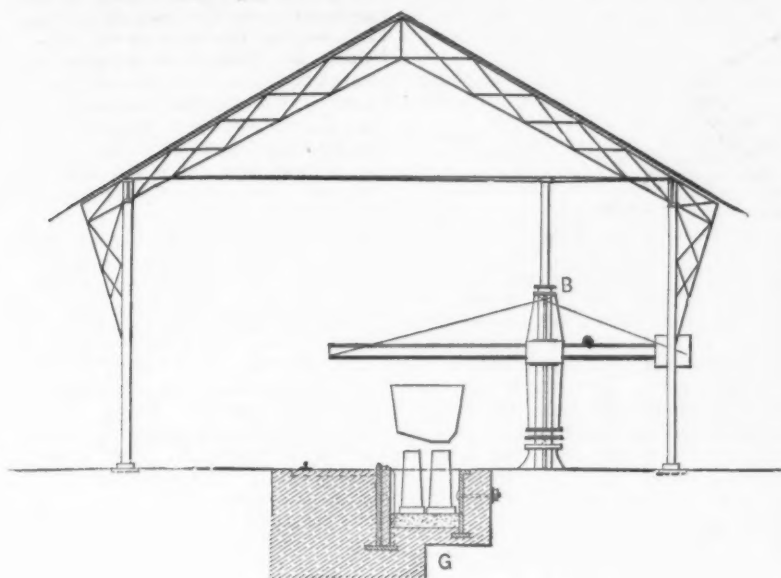


Fig. 14.—Cross Section through Casting House.

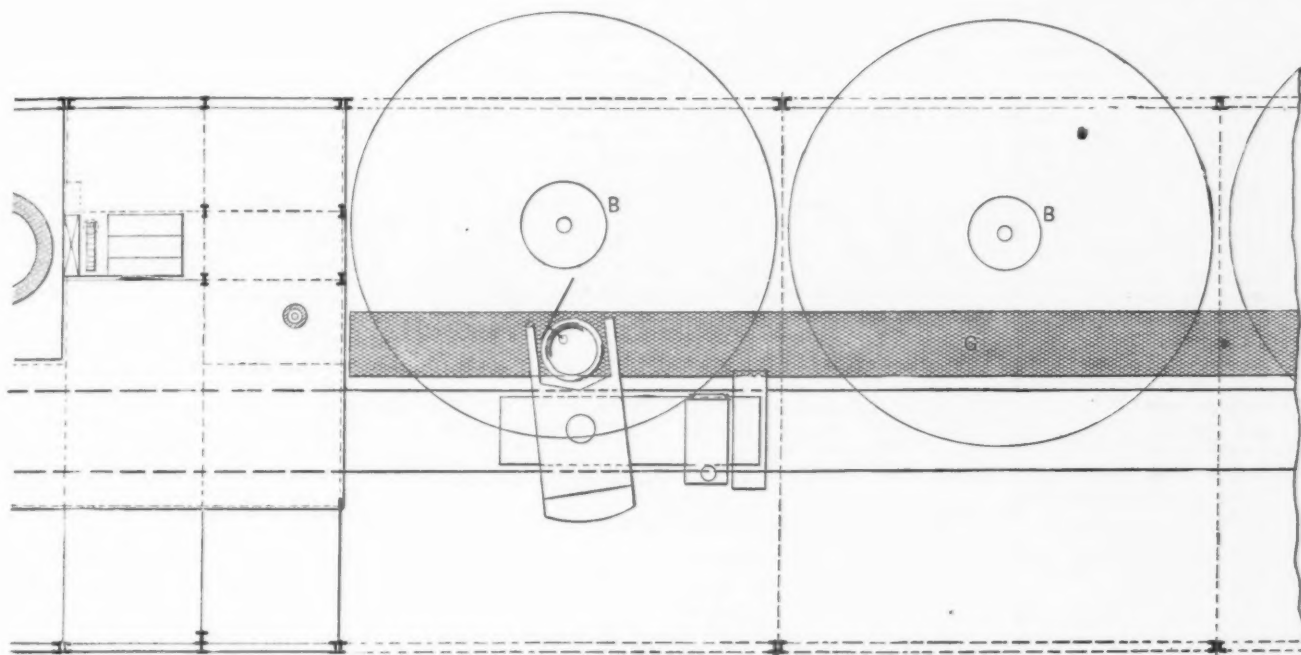


Fig. 11.—Plan of Converter and Casting House.

reversing rolls for armor plate, on the other hand, have as high as 1200 mm. diameter and 4000 mm. length. In one establishment, such rolls are made of forged cast steel. The three-high train with loose middle roll has also been successfully used for universal mills; in which case, however, the vertical rolls come into play during the pass in one direction only.

I would add, in conclusion, that several German manufacturers of machinery have furnished, at my request, drawings and photographs of their improved devices, and that I shall be happy to give to those who may feel an interest in the matter more detailed explanations than the foregoing pages contain.

Judge Lacombe, in the United States Circuit Court, on the 20th, handed down a decision in the case of John H. Clews against the Woodstock Iron Company. The suit was begun by summons in the State Supreme Court in this city to recover an alleged interest in certain stock and property of the Oxford Iron Company, a

corporation of Alabama, which some years ago belonged to Henry Clews, the banker. He transferred his interest to his brother, the complainant, who in turn transferred the property to one Mackewan. This Mackewan sold it to the defendant for \$2000. The property has been greatly improved by the Woodstock Iron Company and is now of great value. Mr. Clews seeks to recover it on the ground that it was sold under false pretences, it being represented to be of little value. The case was transferred to the United States Court, and a motion to set aside the summons in the action was argued before Judge Lacombe. His decision is in favor of the defendant. The Judge in his opinion says that the summons was served on Alpheus L. Taylor, president of the company, who is a resident of Alabama, while he was in this city on business connected with the company. The corporation has no agent in this city, and hence the summons was set aside.

The new navy of the United States at the present rate of progress in its development from the raw materials will soon

become formidable. Three cruisers have been launched during the last 12 months, and the armored cruiser Maine will be launched from the Brooklyn Navy Yard some time in November. There are now well under course of construction or nearing completion 17 vessels authorized by previous Congresses. Of these, there are eight cruisers, five of which are protected; one steel practice vessel, two steel gun vessels, one coast defense vessel, one battle ship and four monitors. In addition to this, the Naval Appropriation bill for this year appropriates for "increase of the Navy" as follows: Three coast line-of-battle ships, \$12,000,000; one protected cruiser, \$2,750,000; one torpedo cruiser, \$350,000; one torpedo boat, \$125,000. These amounts represent the limit of cost and do not include armaments. While the United States is exceeded in the volume and expense of new construction by England, France, Portugal and perhaps Russia, none of these countries presents evidences of greater advancement in that work.

Robert Adams, Jr., Minister to Brazil, is a strong advocate of Secretary Blaine's

plan of having reciprocal trade relations between the United States and the Latin States. He says all the conditions are favorable for the increase of our trade. The recent difficulties between England and Portugal, which excited the sympathy of the Brazilians for their mother country, have strained their relations with Great Britain. Leagues were formed to boycott English goods and manufactures, and resolutions were passed looking to the United States for their future supplies. The prompt resumption of diplomatic relation by the United States with the provisional government, we being the first so to do, followed by our formal recognition of the Republic, has created a most cordial feeling toward our country. That our manufactures are held in high esteem in Brazilian markets, wherever properly represented, is evidenced by the practical monopoly of American locomotives, a particular line of sewing machines, and one firm's agricultural implements. These and others, however, can only be sold by specimens exhibited on the spot by competent salesmen who speak the language.

THE WEEK.

A correspondent of *The Iron Age* in Denver has analyzed statements which have gained currency relative to the nationality and amount of capital of business firms in the Argentine Republic. These statements originate for the most part in letters purporting to have been written by foreign correspondents, and in the case here referred to gross inaccuracies are apparent, particularly in the paltry allowance made for American capital, compared either with European or native firms.

The 420 delegates representing the Brotherhood of Locomotive Engineers, assembled at Pittsburgh, were highly commended for their personal appearance. The antecedents of the leading members are thus stated: Grand Chief P. M. Arthur, the presiding officer of the convention, had his first experience of railroading on the New York Central in 1852. When he had been raising steam for two years he was promoted to the regulator and remained in the company's service for 22 years. At the Baltimore Convention of 1869 he was elected S. G. C. E., and was elected grand chief at Cleveland, Ohio, in 1874. He has retained this office since. He has displayed great executive ability and is a conservative leader. First Grand Engineer T. S. Ingraham began braking on the Toledo, Wabash and Western road in 1857. He first commenced to "keep her hot" in the following year, and in the year following was promoted to a yard engine. He commenced to run regularly in 1860. He has been a member of the Executive Committee, and was elected to his present office in 1872. Second Grand Engineer Deloss Everett, after serving some time as a machinist, first shoveled coal on the Pennsylvania in 1855. He got his engine in 1862. He was elected to his present office at the Chicago Convention of 1887. First Grand Assistant Engineer H. C. Hays entered the service of the Michigan Central in 1863. After braking on several roads for a time he fired the first engine that crossed the Kansas River. Subsequently he entered the service of the Detroit, Lansing and Northern road, where he remained for 15 years. He was elected to his present office in 1886 and has held it since.

The destruction of the Leland Hotel, at Syracuse, which was reduced to ashes in 30 minutes, although nominally fire proof, emphasizes the demand that structures of this character—great public hostleries—should be made entirely of incombustible materials, such as stone or brick, in combination with iron. In the Syracuse hotel there was the collection of grease in the kitchen, the skylight above, and a sort of well which served to carry the fire to the rooms of the guests—exactly the conditions to invite destruction by fire.

The United States, during the calendar year 1889, furnished 71.23 per cent. of the total imports of cattle into the United Kingdom, and British North America 17.52 per cent. The aggregate value during 1889 from all countries was \$39,581,180. The importations of fresh beef aggregated in 1889 only \$14,741,378, and the United States contributed 93.32 per cent. The proportion was nearly the same (94.71 per cent.) in the case of salted beef, of which the total importations were only \$1,784,925.

Russia is gaining ground as a wheat producer for Europe. For the year 1889 the exports to Great Britain were nearly equal to those from the United States, and for the current year the crop in Russia will not only be large, but be produced at the lowest cost, on account of the introduction of improved machinery. The following shows the export of wheat and

flour to Great Britain from this country and Russia for the two last years, ending with August of each year, in centals (a cental being 100 pounds):

	Last year.	Year before.
From Atlantic ports of United States.....	45,172,000	28,480,000
From Pacific ports of United States.....	24,139,200	23,264,000
Total from United States.....	69,311,200	51,744,000
Total from Russia.....	35,982,000	45,784,000

This does not include about 4,600,000 sent from Germany last year, a portion of which went from Russia and the rest from Hungary. The latest news is that Russian shipments of wheat to England are so voluminous as to cut off demand from American sellers, and that the bulk of the surplus around the Black Sea is expected to be shipped before the close of navigation. The United States must look more to the Southern republics for a market for surplus products.

Pittsburgh is agitating in favor of establishing a trades school on the New York plan.

It is stated that the Marquis D'Aulnay, representing manufacturers of ordnance and steel plates at Le Creuzot, France, is now in this country to inspect the various steel manufacturing centers, with a view of establishing a branch of the Le Creuzot foundry in the United States.

The following table shows the exports of beef, hog and dairy products for the nine months ended September 30, in the years 1889 and 1890, from the four leading Atlantic ports:

	1889.	1890.
New York.....	\$51,804,316	\$55,560,322
Boston.....	18,047,455	22,008,976
Baltimore.....	4,421,586	9,805,837
Philadelphia....	3,787,861	3,840,002

While the pre-eminence of New York is at once apparent, Philadelphia is more than ever restive under the alleged railroad discrimination that cripples her export trade.

The celluloid and zylonite manufacturers in various branches have consolidated, with a capital of \$6,000,000.

The National Carriage Makers' Association recommends the establishment of technical schools.

The Puget Sound coal basin extends from beyond the British boundary south almost to Columbia, and from the Pacific Ocean eastward up into the Cascade range. With only a few mines developed to any extent, there was an output during the year 1889 of 1,000,000 tons, valued at \$4,500,000. Of this amount King County produced 450,320 tons. The output for 1890 will considerably exceed that of the past year. The total output of coal from Seattle from January 1 to June 1, 1890, was 201,180 tons.

The regular lines of steamers that are now running between the coast of Venezuela and the United States have greatly developed our trade within the district of Carupano, says United States Consular Agent Orsini. We are successfully competing with our French, English and German rivals.

Assistant Secretary Spaulding, of the Treasury Department, has issued a circular to officers of the Customs and others, calling attention to Section 7 of the new Tariff law, providing that on and after March 1, 1891, no article of imported merchandise which shall copy or simulate the name or trade-mark of any domestic manufacture or manufacturer shall be admitted to entry at United States custom houses.

Railway rates are commonly supposed to have much influence upon the price of grain, but an elaborate statistical com-

parison of rates and prices for a number of years past seems to indicate that there is little correspondence between one and the other. In 1889, when corn touched the lowest price for 27 years, the percentage of reduction in rates compared with the rate of 1874 was about as great as this abnormal reduction in the price, and during the present year, while the price of corn has nearly doubled, the same low rate has been maintained.

Mr. Rockefeller, the oil king, has an electric plant on his Hudson River estate that cost over \$150,000. Not whales merely, but oil wells "pale their ineffectual fires" in doing homage to electricity.

"California on Wheels" is the title given to the three cars which are now in the Central yards at Jersey City. They have been making a tour of the country, carrying an exhibit of the products of the Golden State. The principal car is given up to specimens of California fruits, tastefully arranged in glass cases. Silk is displayed in its various stages from the raw cocoon to the manufactured articles. Cotton is also to be seen, which will compare favorably with the products of Southern States. Bananas are shown 4 inches in diameter. Samples of wheat, rye and corn show the manner in which cereals thrive on the Pacific Slope. The second car is devoted largely to a display of California wines.

The Riverside Bridge and Iron Works, of Paterson, N. J., have closed a contract with a Mexican syndicate to erect an iron amphitheater in the city of Mexico that shall cost \$25,000. The amphitheater building will have an iron dome 75 feet high and 200 feet in diameter. Bids from abroad were far in excess of these figures.

A dozen more hotels will be added during the coming year to the 128 great hostleries already in New York City, and this although something like \$25,000,000 have been invested in this kind of property during the last decade. The work of demolition has commenced preparatory to the erection of the new Astor Hotel on Fifth avenue and Thirty-third street. Another on Fifth avenue and Thirtieth street is nearly finished; and still another, to cost \$800,000, is rising on Fifth avenue and Fifty-ninth street. Three more hotel buildings, costing each from \$200,000 to \$325,000, are far advanced.

The City of Vancouver, British Columbia, the future terminus of the Canadian Pacific steamship line, now has a population of more than 15,000.

The length of the proposed submarine cable from Vancouver to Sydney, New South Wales, would be 8900 miles, separated in sections by intervening islands. The longest stretch would be 2700 miles. The estimated cost is \$9,000,000. The Imperial Government declines to commit itself, for the present, until certain questions of revenue are determined.

The Census Bureau announces the population of the State of Pennsylvania to be 5,248,574; increase, 965,683, or 22.55 per cent.

The clause in the River and Harbor bill relating to the Harlem River improvement is intended to reconcile the interests of railways and of the navigable waters they cross. The bridges are to be raised, but the draws are to be opened only between 10 a.m. and 5 p.m., and then only for steam vessels either "with or without vessels in tow."

The reported alliance between the Vanderbilt and Reading interests, to eventuate in the completion of the South Penn Railroad, thus securing a common outlet by means of the Poughkeepsie Bridge, is contradicted by the *Philadelphia Record*, which says there exists an ironclad agree-

ment that prohibits the Pennsylvania Railroad from seeking freight in New England, and at the same time prohibits the New York Central from soliciting traffic south of New York.

An extraordinary lumber cut in the Northwest is predicted for the coming season, there being more logs in the Mississippi River now than ever before.

The Hudson River grape crop this season is estimated at 50,000 tons.

Long Island City is to have a railway depot costing \$500,000.

A Boston car works syndicate with \$500,000 capital has decided to locate at Beaumont, Texas.

C. W. Bouynge, of San Francisco, is said to be in London with the object of laying another Atlantic cable, to cost \$4,000,000.

The Civil Engineers' Club, of Cleveland, last week heard a paper read on "Railroads, Past and Prospective," by J. H. Sargent, who drew a glowing picture of the electric railroad of the future, and enjoined his brother engineers to keep abreast of the spirit of advancement in their several departments. The verdict of the club was that electricity would not supersede steam in railway transportation under present conditions.

A pitiable case of destitution and death is reported by the London *Times*. It appeared from testimony taken before the Coroner's jury that a child had died because the father had no "Union card." The coroner, in reviewing the facts, stated that "this is the fourth case in this district in which the death can be traced directly to the strikes."

Andrew Carnegie, according to the Philadelphia *Record*, has gained control of the newly found manganese mines, located on the south side of Cuba in the vicinity of Santiago de Cuba, and is now laboring to establish a line of first-class steamers to carry the product from Santiago de Cuba to Philadelphia for shipment to Pittsburgh and other points where his large steel plants are located.

About 150 prominent business men of St. Louis contemplate the organization of a manufacturers' club and the erection of a building to cost \$300,000.

Manager Parkhurst, of the Globe Iron Works, at Cleveland, is reported as saying that three steel steamers, 300 feet in length, will be built this winter for the Lake Superior trade, one at the Globe Works and two at Chicago, where contracts are about being closed.

Barbour Bros., at the fair of the Massachusetts Mechanics' Association, show flax in all its stages of preparation and complete manufacture.

The prospect that the hemp and linen industry will become permanently established in the United States brings into view new appliances for the preparation and manufacture of the raw material. C. Aultman & Co., of Canton, Ohio, have recently added to their line of machines a hemp thresher, or brake; a device by means of which the fiber of American grown hemp can be made available for the manufacture of binding twine of the best quality. Hemp has been raised many years for its fiber, but the processes employed in its manufacture have been expensive and wasteful. The C. Aultman & Co. machine obviates the necessity for these processes. The great advantage of the new device, however, is in the swiftness with which it threshes and separates the straw from the fiber, delivering the latter almost clean enough to go directly to the spinner.

MANUFACTURING.

Iron and Steel.

The universal department of the Millvale Rolling Mill, at Pittsburgh, formerly operated by Graff, Bennett & Co., and which has been idle since the failure of that firm several years ago, was put in operation last week. The bar mill department will be put in operation during the present week. It is expected that about 200 men will be given employment. The plant is being operated under lease by the Millvale Iron Company, Limited.

The plant of the Maumee Rolling Mill Company, at Toledo, Ohio, is being operated full time in all departments. An addition of two double puddling furnaces has been made, both of which are now in operation.

All departments of the plant of the New Philadelphia Iron and Steel Company, at New Philadelphia, Ohio, are being operated to their full capacity. There are 14 single and one double puddling furnaces in operation in the puddling department and four trains of rolls in the finishing department. The product is sheets and plates.

Soho Furnace, of the Moorhead-McCleane Company, at Pittsburgh, was blown out last week for relining and repairs after a very long and successful blast lasting two years and four months.

We are informed that the report that the Bellaire Nail Works, of Bellaire, Ohio, used on an average 11,000 bushels of coal every two weeks at a cost of 3½ to 4 cents per bushel is not correct. The firm use about 2000 tons of coal every two weeks, at a cost of about 3 cents per bushel. They mine their own coal, and this cost covers everything to the delivery of the coal at their plant.

The plant of the Spaulding Iron Company, at Brilliant, Ohio, is now being operated by the Brilliant Iron and Steel Company, of Wheeling, W. Va. As yet the puddling department, consisting of 20 furnaces, is all that is in operation, and about 50 tons of muck iron are being turned out per day. The company are employing from 125 to 135 men, of which number 25 are coal miners. George K. Wheat is president and Alex. Updegraff is secretary of the company.

No. 1 furnace of the Isabella Furnace Company, at Aetna, Pa., was blown out on Wednesday, the 15th inst., for relining and repairs. The furnace is 18 feet at the bosh and 75 feet high, and was blown in on the present lining on August 1, 1888, and made 176,252 gross tons of iron from that date until it was blown out. The new stack of this company, to be known as No. 3 furnace, is about ready for blast and will go in during the latter part of this month.

It will probably take more litigation to decide the matter of the sale of the plant of Brown, Bonnell & Co., at Youngstown, Ohio. The Leadville Coal Company and Charles S. Worden, of Cleveland, have appealed to the Supreme Court of the United States against the decree of confirmation of the sale which refused to allow the claims of these petitioners for leave to participate in the division of the proceeds. The Supreme Court has already convened, and a motion will probably be made early in the session in behalf of the receiver of Brown, Bonnell & Co. to dismiss the appeal. In case this appeal is granted it will end the litigation and the sale of the plant will be carried out.

In answer to the report that the Duquesne Tube Works Company, of Duquesne, Pa., were about to make some extensive additions to their plant in the near future, we are advised that there is no truth in the report. The firm have at times considered the question of adding another furnace to their plant, but have not come to a definite conclusion.

A company with a capital stock of \$200,000, to be known as the Toronto Rolling Mill and Forging Company, has been incorporated at Toronto, Canada, for the purpose of establishing a rolling mill and furnace for the manufacture of wrought iron and steel, and to purchase and develop the plant and business of the Toronto Drop Forge Company.

The Pillows & Hersys rolling mills, at Montreal, were recently destroyed by fire. The mill works were not damaged but will be compelled to shut down, as supplies were drawn from the rolling mill. The loss is \$80,000, insured, and 300 men are thrown out of employment.

Since the successful production of basic steel by the Southern Iron Company, the Roane Iron Company, of Chattanooga, Tenn., report that they will put in a steel plant at Rockwood, Tenn., that will be the largest in the South.

In accordance with a resolution passed by the Board of Directors of the Mary Pratt Furnace Company, of Birmingham, Ala., on ac-

count of a business disagreement between the stockholders, a bill has been filed in chancery asking that a receiver be appointed, the property sold at public auction and the affairs of the company wound up. The property consists of about 32 acres of land in the city of Birmingham, the Mary Pratt furnace plant, consisting of one stack 14 x 65 feet, rebuilt in the spring of 1889; three Whitwell hot blast stoves, two 72-inch blowing engines, eight boilers, brick casting house with iron roof, a double engine house, stock house, double brick hoist tower, with two elevator cages; blacksmith shop, stables, locomotive house, &c. Some four miles of railroad yard track belong to the plant, and connect with all the roads entering Birmingham. Valuable contracts for ore, coke and limestone, which have several years yet to run, will go with the property. A bonded debt of \$100,000, bearing 7 per cent. interest, was placed upon the property in 1880, and has nine years yet to run. Fifty-seven thousand dollars of these bonds yet remain unpaid, and it is expected that the property will be sold subject to these outstanding bonds.

A company is being formed at Pottstown and Boyertown, Pa., with a capital of \$160,000, to pump out and work the magnetic iron mines at the latter place.

A fire in the casting room of the Union Iron Works, Portland, Ore., recently destroyed property valued at \$47,000.

The Great Northern Iron and Steel Company, capital \$2,000,000, have filed articles of incorporation at Duluth, Minn.

The contract for building a \$25,000 iron amphitheater in the City of Mexico has been awarded to the Riverside Bridge and Iron Works, of Paterson, N. J., by a Mexican syndicate.

The furnace now being built by the Max Meadows Iron Company, at Max Meadows, Wythe County, Va., under the management of M. H. Maury, will be 75 feet high, with 17-foot bosh, and is expected to produce 125 tons daily. The foundations are about completed, the cast house is erected, and the stove shells are about ready to receive the fire bricks. E. P. Allis & Co., of Milwaukee, have shipped the engines which will furnish power for the plant, and barring delays in obtaining other materials, the furnace will be ready for blast about June 1. The coke supply will be obtained from the Pocahontas Flat Top fields, and the company is opening a mine about three miles from the furnace from which they expect to secure one-third of their ore. Another third will be taken from the Consolidated Mining Company's Clark Summit mines, and the remainder from the Carroll County "Gossan" ore.

Pioneer Furnace, of the Iron Cliffs Company, Negaunee, Mich., is to have an additional stock house, 66 feet square, of corrugated iron.

The Harrison-Howard Iron Company, of Bessemer, Ala., have been awarded the contract for supplying \$150,000 worth of iron pipe for Atlanta's (Ga.) new water works.

The spike mill of the Midway Iron Company, Roanoke, Va., is almost completed, and work will probably begin within 30 days.

Edge Hill Furnace, operated by the Crane Iron Company, of Catsaugua, Pa., has chilled. Some 30 feet of solid iron will have to be dug out.

The furnace of the Pulaski Iron Company, at Pulaski City, Va., has been lighted after 60 days of idleness. Thorough repairs have been made throughout the entire plant—the furnace relined, the machinery repaired and improved, a new Spearman gas valve put in, and other important modifications effected.

Twenty acres of land and a subsidy of \$35,000 have induced the Indiana Steel Company to locate their plant at Wabash, Ind. The company have a capital stock of \$500,000, and will begin building at once. The works are expected to give employment to 500 men.

It is expected that furnace "A" of the Monongahela Blast Furnace Company, McKeesport, Pa., will be ready to blow in November 15.

Isabella Furnace, charcoal, at Barneston, Pa., which was burned down January last, has been rebuilt and will be put in blast November 1.

A converter in the Bessemer steel department of the Otis Iron and Steel Works, Cleveland, Ohio, exploded on the 16th inst., blowing the roof from the building and setting fire to the woodwork. Several men were slightly burned by the flow of metal. The loss to the company was slight.

The laying of the corner stone of the Gracey Woodward Iron Furnace will take place at Clarksville, Tenn., on the 27th inst. Prominent men in the iron trade have been invited to speak.

Machinery.

H. H. Thompson, proprietor of the Phoenix Iron Works Company, manufacturers of steam cranes, is compelled to operate his plant to its utmost capacity in order to keep pace with the demand for cranes. At present he is filling an order for 12 immense pivot cranes for the Shickle, Harrison & Howard Pipe Works, at Bessemer, Ala. One of these is said to be the largest pivot crane ever built in this country.

Mackintosh, Hemphill & Co., Limited, founders and machinists, of Pittsburgh, have recently shipped to the Pennsylvania Steel Company, at Sparrow's Point, Md., two reversing engines 42 x 60 inches, and are also filling orders for nine blowing engines for shipment to different parts of the country. These engines are 40 x 84 x 60 in size.

Ground has been broken at Ticonderoga, N. Y., for the erection of a large plant for the manufacture of a hot air engine, invented by Woodbury, Merrill, Patten & Woodbury, of South Boston, Mass. The building now being erected is 148 x 80 feet, and will be followed by a large number of smaller buildings.

The Schoen Mfg. Company, manufacturers of railroad supplies, at Philadelphia, have purchased a tract of land at Pittsburgh, and will remove their business there as soon as the buildings are erected.

The Dexter Machine Company will shortly remove their plant from Bangor, Me., to New York City.

In order to meet the increasing demands of their business, the directors of the Pratt & Whitney Company, Hartford, Conn., have voted to erect a new factory building, to be 300 x 45 feet and two stories high. Work on the new structure will commence at once.

Hardware.

In one day's turn recently the rod mill department of the Beaver Falls Mills of Carnegie, Phipps & Co., Limited, at Beaver Falls, Pa., turned out 205,000 pounds of rods. On the 15th inst. the wire nail department made its largest record for one day by turning out 1722 kegs of finished nails on 112 machines.

Galveston Tinware Mfg. Company have succeeded to the business of Houn & Keats, Galveston, Texas, and are manufacturing fruit, oyster and paint cans. Of this company A. B. Homer is president, L. V. Elder vice-president and Thomas Keats secretary.

The Towers & Sullivan Mfg. Company, Rome, Ga., have added to their plant during the past summer, both to the building and machinery, to enable them to keep up with their increasing trade for plows, plow stocks, cultivators, steel blades, single trees, &c., which they have been manufacturing many years. They have especially added the most improved machinery, and now make all of their handles which they formerly bought.

The Ten Eyck Edge Tool Company, Cattaraugus, N. Y., send catalogue and price-list of their axes and edge tools. It will be remembered that in January of this year the main factory building of the company was entirely destroyed by fire. They immediately commenced to rebuild, their new factory being nearly double the capacity of the one destroyed, and is equipped with new and improved machinery. They state they are now having all they can do, and find it difficult to keep up with their orders.

J. Fred Wilson, Worcester, Mass., has within the past year doubled his capacity for the production of the regular line of cold punched nuts and washers of all kinds, and in addition is doing a more extended and general business in die and press work, polishing and nickel plating. The volume of trade is referred to as having been satisfactory during the past season, with indications of a busy winter ahead.

Sutton Bros. & Bell, Indiana, Pa., manufacturers of agricultural implements, foundry goods, mill and farm machinery, &c., state that their stump puller trade has crowded their works to such an extent that other lines have given way to enable them to keep up with their orders on stump pullers. They are now completing a two-story building, 48 x 250 feet, and another one 40 x 100 feet. Upon occupying these they will resume the manufacture of their full line of goods.

The Worcester Machine Screw Company, Worcester, Mass., have recently purchased of J. E. & A. E. Estabrook the plant they have occupied for the past ten years, which comprises a brick building 250 feet long, two stories and basement, with wing 50 x 40, which is used for shipping room and offices, engine and boiler room outside of main building, and about 30,000 feet of land, an 80 horse-power Corliss engine and 100 horse-power boiler. They are now erecting new brick buildings, a

store house 80 x 25 feet, two stories high, for coal and lumber, and also room for box making, a brick building 80 x 25, one story high, for stock room, blacksmith shop and case hardening furnaces. They are also erecting a chimney 85 feet high, 3 feet flue. They state their business is good, having had all they could do the past year, and trust that with the improvements now under way they will be better able to care for their rapidly growing trade.

Wiard Plow Company, Batavia, N. Y., advise us that since the construction of their works in 1876 they have never been shut down except for necessary repairs, and then the time has been limited as far as possible.

Miscellaneous.

A charter has been issued to the Clearfield and Crush Creek Coal and Coke Company, of Indiana, Pa., with a capital stock of \$75,000. The following are the directors: J. W. Hoover, Phillipsburg; G. D. Collins, Nebraska; George Prothero, Henry Prothero, Hortens; W. V. Hughes, Pittsburgh.

The employees of the car shops of the Philadelphia and Reading Railroad Company, at Reading, Pa., have been notified that in the future they will be required to work 15 hours daily on Monday, Wednesday and Thursday of each week. In every department of the establishment the work has increased to such an extent that the present force has been unable to turn it out as fast as needed. At present about 900 men are employed in these shops.

The Fuel Gas and Mfg. Company, of Pittsburgh, have about completed the removal of their machinery from their shops in that city to those recently vacated by the Westinghouse Air Brake Company in Allegheny, Pa. The new location will give the company an enlarged capacity. A brass foundry will be added, as well as other departments, and the output will be considerably increased.

Several remarkable works of art are now in process of execution or shortly to be undertaken at M. H. Mosman's foundry at Chicopee, Mass. One of these upon which work has begun is the colossal statue of T. Starr King by Daniel C. French, son of Judge French, of Concord, and sculptor of "The Minute Man" that stands by Concord Bridge. This statue of King is to be placed in Golden Gate Park, San Francisco, to commemorate there his services in saving California to the Union. Good progress is also being made at this foundry upon the equestrian statue of Grant for Chicago. Another fine piece of art work being executed is the "Rome" of Anne Whitney, of Boston. Mr. Mosman has also received the contract for doors and other bronze ornaments for the receiving tomb to be presented to the city of Lowell, probably including tablets showing lotus leaves, and two large sphinxes to be placed at the entrance to the tomb.

A scheme is on foot in Minneapolis, Minn., backed up by the Business Men's Union, to induce manufacturing enterprises to locate in that city. The idea is to raise a subscription fund of \$1,000,000, to be paid out within the next three years to new manufacturing and jobbing concerns. It is expected that this method will be the means of establishing new works and of bringing to Minneapolis plants already established, but willing to change if a suitable bonus is offered.

The Pullman Palace Car Company, of Pullman, Ill., are completing arrangements for the erection of a repair shop at a cost of \$250,000. The building will be 500 x 500 feet, two stories high, and will be thoroughly equipped in every respect.

The Colts are reported to have bought the American rights to the Giffard gun patents for \$1,000,000. Liquefied carbonic acid gas, converted by liquefaction into one of the most powerful propulsives known, is the agent of power, and is accompanied by neither smoke, noise, recoil nor smell. It is not affected by heat or dampness, and it is so cheap, it is said, that 250 bullets can be fired at a cost of a penny. The Giffard gun promises to revolutionize the field it is intended to fill, and the Colts are to be congratulated on their enterprise in securing such an important and formidable weapon.

Three superior twin-screw steel steamers will be built for the lakes, probably at Cleveland.

W. L. Scott, the well known coal operator, has voluntarily given his miners an advance in wages. Within the last few days notices have been posted at all of his mines along the Baltimore and Ohio Railroad, and the Pittsburgh, McKeesport and Youghiogheny Railroad, stating that on and after November 1 next the price for mining coal over a 1½-inch screen will be 80 cents per ton. This is an advance of 2 cents per ton on the price now being paid. The notice also states that 66

cents per ton will be paid on and after November 1 for coal mined over a ¾ inch screen. This will also be an advance of 2 cents per ton over the present price, and will be 1 cent more than the price being demanded by the striking miners at Irwin Station, on the line of the Pennsylvania Railroad.

It is reported that a Boston syndicate will establish large car equipment works at Beaumont, Texas, under the title of the Beaumont Car Works, and that ground has already been broken for the plant. The company are said to have a cash capital of \$500,000, and the citizens of Beaumont have subscribed \$100,000 to the enterprise, besides giving valuable privileges.

More Naval Vessels.

On the 18th inst. the Navy Department issued an advertisement inviting proposals for the construction of a harbor defense ram of 2050 tons, a torpedo boat of 112 tons and a swift torpedo cruiser of 750 tons. The ram will be constructed in accordance with plans prepared at the Navy Department. She will be required to maintain a speed of 17 knots an hour for two consecutive hours, and a premium of \$15,000 will be allowed for each quarter knot in excess of that rate. The torpedo boat will be constructed on plans provided by the bidder, with a view of developing a speed of 24 knots per hour. For speed in excess of that rate a premium will be allowed of \$1500 for each quarter knot up to 25 knots and of \$2000 for each quarter knot in excess of that rate. The vessel will not be accepted unless she makes at least 23 knots, and a penalty of \$5000 will be imposed in case she makes less than 24 knots. The torpedo cruiser will be built on the Department's plans and is required to develop a minimum speed of 22 knots. A penalty of \$10,000 is prescribed for each quarter knot less than 23 knots, and a premium will be allowed at the rate of \$10,000 per quarter knot above 23 knots and up to 24 knots, and of \$20,000 per quarter knot in excess of 24 knots. Bids for the ram and the torpedo boat will be opened on December 20 and for the torpedo cruiser on February 11, next.

Commodore Folger, Chief of the Bureau of Ordnance in the Navy Department, is about to conclude arrangements with an American firm for the manufacture of common shells for rapid fire guns, from 6-inch caliber down, from forged steel by the Caylor-Courtney process. The shells are drawn out much the same as common brass shells are made. They have given very good satisfaction in the English Navy, as their walls can be made much thinner than in cast shells, with a corresponding increase in the bursting charge. They can be made as cheaply as or cheaper than the cast shells. It is probable that the same firm will undertake the manufacture of the Whitehead automobile torpedo in this country.

The 35-caliber 6-inch gun used at the recent Annapolis armor trials proved so efficient that it has been determined by the Navy Department to build no more 6-inch guns of less than that length after the forgings at present contracted for are worked up. It is also very likely the length of all the 8-inch guns built hereafter, including those for the new battle ships, will be 40 calibers instead of 35, as heretofore. The contract for all the forgings for the batteries of the new battle ships will be let to the Bethlehem Iron Works in a few days, and a considerable contract will also be let to the Midvale Steel Works for forgings for various calibers. These two contracts will supply materials for the Washington Ordnance Factory for about two years. Forgings are now being delivered with considerable rapidity by the Bethlehem company, who will ship their first 12-inch forgings about November 1.

The Iron Age

New York, Thursday, October 23, 1890.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

An Engineers' Congress in 1893.

Quite an important meeting was held in Chicago on the 14th inst. Representatives of a number of engineering societies met in the rooms of the Western Society of Engineers for the purpose of arranging the preliminaries for holding an international congress of engineers during the World's Fair at Chicago. It is proposed to hold it within the exposition, to last six days, and to be conducted in the English language. The various sections into which the congress will be divided will be as follows:

Railroad engineering, hydraulic engineering, bridge engineering, steam engineering, marine engineering, military engineering, electrical engineering, mining engineering, mechanical engineering. A chairman and secretary for each section are to be designated in advance and the sessions to be so timed that papers and discussions on allied subjects shall not occur simultaneously so as to preclude those interested from attending several sessions. All papers so far as practicable to be furnished in advance, examined by a committee, and, if found acceptable, printed for distribution before the meeting of the congress, at which they will chiefly be read by title, so as to admit of immediate discussion. Intending contributors to be requested to confine their papers as far as possible to: A. Accounts of new methods or inventions in actual use. B. Description of new engineering tools in actual use. C. Description of novel machines in actual use. The papers and discussions to be subsequently printed and furnished to members who may so request at a stipulated price.

The scheme which has been outlined further proposes to establish, during the entire six months of the exposition, a joint engineers' headquarters within the exposition, to be maintained and managed jointly by the several engineering societies of this country. A sufficient staff would be engaged, if the scheme proves successful, to give information relative to the location of the various engineering exhibits, to give foreign engineers information about matters in their line outside of the exposition, to promote social intercourse among engineers, &c. The plan contemplates the co-operation of civil, mechanical, mining, electrical and other engineers, and will depend for financial support on a small per capita to be contributed by the members of the various engineering societies.

Those who have been favored with some degree of intimacy with the foreign iron and steel manufacturers and engineers now visiting this country will bear witness that many of them have expressed the determination to revisit us as individuals in 1893. Each man may be looked upon as a special committee of one whose duty it

will be to so interest his neighbors and associates with his report of the marvels to be seen in this country that a great influx of engineers may be expected in 1893. In view of this it seems to be eminently proper that the engineering societies of the United States should establish a headquarters at the exposition, where they will be welcomed and supplied with information to assist them in accomplishing, in the best manner, the object of their visit. The exposition of 1893 will present a wonderful array of engineering riches and will undoubtedly be well worthy of careful study by the engineers of all nations. The proposed establishment of an engineers' headquarters should meet with widespread approval.

The Condition of Trade.

Exports and imports are watched at the present juncture in business affairs with scarcely less interest than monetary questions, or the operation of the new tariff. The inordinate rush of importations having measurably ceased, the conspicuous fact now is an unprecedented volume of exports. From the ordinary weekly average of about \$5,000,000 prior to September last, the aggregate valuation suddenly expanded to upward of \$16,000,000 for the week ending October 14th, giving rise to many finespun theories respecting the course of trade. It appears from subsequent explanation at the Custom House that the statistics were grossly misleading, inasmuch as they indicated an accumulation of clerical work, rather than an increase of merchandise, several cargoes previously omitted being represented in the figures finally given to the press. Although editorial comments in some instances were rudely shattered, the exports of several important commodities continue on a liberal scale. In breadstuffs the deficient exports from the Atlantic coast are in part made good by exports from California, while in cotton there is a large gain. Exports of oil are also in excess, and in provisions there is a substantial gain. The September exports for two years compare as follows:

	1889.	1890.
Cotton.....	\$21,094,640	\$17,907,778
Provisions.....	11,918,146	8,707,645
Breadstuffs.....	7,194,319	9,490,304
Petroleum.....	5,370,515	4,578,760
Cattle and hogs....	2,587,676	2,850,248
Total.....	\$48,165,296	\$43,843,735

The most striking feature in this review is the pernicious effects of "pegging up" the price of grain above the parity of foreign markets, checking the demand from England and enabling Russia and India to market their products at the expense of the American farmer, and to the detriment of all classes of traders dependent on the prosperity of the agricultural interest. Investors likewise suffer from the loss of railway earnings in eastbound traffic. The Cincinnati *Price Current* figures up from the latest crop returns by the statistician at Washington that the

apparent exportable surplus of wheat from our crop of this year is only 25,000,000 bushels from the Atlantic slope and 40,000,000 from the Pacific slope, the latter including 5,000,000 bushels of previous growth. The total of this surplus is but 60 per cent. of the 110,000,000 bushels in wheat and flour that were exported from the United States during the crop year ending with last June, and a considerable part of it has already gone forward, though the movement is not an active one just now. This shrinkage, it will be observed, directly affects the Atlantic coast. Fortunately, the taking of cotton for Europe is on a liberal scale, exports for the month thus far being about 500,000 bales, a considerable excess compared with last year. Since the opening of the season the movement of cotton from plantations is equivalent to \$65,000,000.

Imports are still heavy but falling off, one consequence of which is that the available Treasury surplus is reduced to a low ebb. An anomaly in the situation is that while railroads in every direction are taxed to their full limit in the demand for transportation, the net earnings are unsatisfactory, and prospects are such as to afford little stimulus to speculation. Locally the demand for dry goods and some other descriptions of merchandise for shipment by the cheap water routes is somewhat increased, while the business done for future account is larger than ever before at this time of the year, indicating confidence in the sound condition of trade. At the same time there are elements of uncertainty, partly connected with monetary conditions, that operate temporarily to unsettle the market. The silver status and tariff adjustments will soon, we may hope, be resolved into definite factors.

Merchant Cruisers in Maritime Warfare.

Several essential points hitherto in dispute were satisfactorily demonstrated by the recent memorable trial of nickel steel plates at Annapolis. Incidentally other facts of scarcely less importance were established, at least inferentially, in regard to the relative value of armored ships and merchant cruisers for naval warfare. If the claims in behalf of nickel steel are conceded, then all war vessels are alike vulnerable, differing only in degree, none being able to withstand the impact of the present steel-pointed missile projected by the improved gun. It does not necessarily follow, however, as has been rashly affirmed, that the existing British navy will be "stripped of its armor" to conform to the new conditions brought about by the advent of nickel steel. But compound armor has suddenly gone into disrepute, and is liable to be thrown aside as no longer meeting modern requirements. It will be readily perceived that in all ordinary conflicts, except where vessels of the highest class are engaged, to be struck is to be pierced. Hence superior speed—i. e., ability to run

away, or, at least, to choose a position—becomes more than ever an essential factor where there is a hostile meeting.

A 6-inch bore, turned out from the foundry at 60 days' notice and capable of sending a 100-pound shot at an initial velocity of 2075 feet a second, is effective at short range for general use, but an 8-inch gun hurling an improved steel pointed projectile weighing 210 pounds will go through and through, except where the defensive armor is of the highest proof. The assumption, therefore, seems warranted that the merchant cruiser or "commerce destroyer," if effectively equipped, is leveled up more nearly than ever before to the same grade with vessels of high warlike pretensions. Forecasting the immediate future, improved armor plates become a first requisite. Beyond this, and hardly less essential, is the merchant cruiser, which is wonderfully enhanced in relative value as a naval combatant. The latter may have her armament already stowed below decks for instant mounting, in conformity to the French idea and usage, or her guns and other fighting appliances may be ready at the nearest port, agreeably to the requirements of the English Admiralty.

The United States Navy since the war and up to a recent date has almost provoked contempt, and it is only this very month that the Government orders a first-class battle ship. It is reasonable to suppose that henceforth development in naval construction will be in some degree commensurate with the extent of sea coast and rapid concentration of wealth at numerous ports inviting attack. The Naval Bureau abounds with valuable data giving the best results obtained in Europe after enormous expenditure in perfecting ships and guns, which Americans may turn to good account. In the light of recent occurrences, the apparent negligence in naval preparations and coast line defenses finds at least a partial vindication. Events also show that relatively, as contrasted with the amount of American tonnage exposed to depredation on the sea, a good start has been made toward the conversion of merchant vessels into effective cruisers. Every American steamer possessing the requisite qualities as to size, strength and speed has been classified by the naval boards, either as "cruisers" or "transports," and plans have been drafted showing the needed alterations and armaments to fit them for service. Beyond this little has been done, but it appears that there are available 20 to 30 steamers which could make from 14 to 16 knots an hour, and with cargo space filled with coal they could be maintained at sea for considerable periods. In taking a new departure, guided by the light that is being diffused by armor trials, tests of guns and new explosives, it would be well if certain rules and principles could be established in regard to all mercantile ships put under construction so that in essential particulars they might conform to a recognized standard and be the more readily convertible in case of need.

Competition Compatible with Brotherhood.

Dr. Lunge, of Zurich, one of the most eminent of the world's chemists, gave utterance to a noble sentiment in an after-dinner speech at Calumet, Mich., last week. In dwelling upon the boundless hospitality which has been showered upon their European visitors by the manufacturers of the United States, he felt impelled to say that hereafter the manufacturers of both continents would be drawn more closely together, and that these acts of international courtesy had made it apparent that competition was perfectly compatible with a feeling of brotherhood. The visit to America by the English and German iron and steel manufacturers has been attended by so many pleasant circumstances that they will return home with the feeling that Americans are, after all, a pretty good sort of people, having much in common with themselves. The man who looks upon another who takes up the same line of trade as an interloper and an intruder will fail to appreciate the force of the good doctor's remarks, and will be unable to comprehend his sentiments, but he who believes that the world is large enough for all of us will find an echo in his own heart. The excellent opportunity presented to foreign iron and steel manufacturers to see for themselves the great extent and varied character of this country has been in the nature of an education, and many of them already feel the conviction that the United States has acted wisely in building up its manufacturing interests.

The transatlantic manufacturer, who sees a lucrative trade with America slipping from his grasp on account of the competition of domestic manufacturers may feel something of bitterness at the causes which have wrought the changed conditions, but he must acknowledge to himself that with an enterprising people the effort would some time be made to divert the currents of trade homeward. Sooner or later a change of that character is inevitable. It may be unpleasant for the individual manufacturer interested that this change comes sooner rather than later, but it is the part of philosophy to bear with such circumstances in the course of trade and to endeavor to counteract them. The competition of Americans for their own home trade grows out of no personal antagonism or antipathy to those who have heretofore been supplying it. It is merely an outgrowth of self interest.

The narrowing of American markets for European fabrications is perhaps an excellent thing for the world at large. How could European manufacturers meet the world's demands for iron and steel to-day if there were but a few insignificant blast furnaces running in the United States? Has not the world at large grown up to the measure of the output of Europe, so that the American demand need not be considered? Did not the price of iron and steel advance rapidly in European markets last year in consequence of the

great demand, although America was not a buyer? It must be borne in mind that the entire world is advancing in civilization and material progress, that countries outside of America are growing rapidly in the consumption of iron and steel, and that other markets are widening so fast that the world's supply of manufactured products needs to be increased. Large as the American tin plate market has been for the Welsh makers, it is quite probable that a few years will demonstrate to them that even in this article the world's demands may make the partial loss of our trade a matter of far less consequence than it seems to be at present.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., October 21, 1890.

If the next session of Congress maintains the momentum of recent appropriations for additional vessels for the navy, the fighting capability of the Government of the United States in vessels of the highest degree of invincibility and speed will rank second to no nation on the globe. The leading maritime nations like England, France, Germany, Italy, Russia and Spain are quoted numerically stronger than the United States in vessels of war of the different types, ancient and modern, but in all their fleets they have nothing which will stand against the ships now under way.

The recent storm in English waters again exhibited the unwieldiness of the great masses of metal which the English call battleships. Their unserviceability on other occasions has been so apparent that American experts taking advantage of their defects have created a fleet of vessels which have not their equal afloat. Attention was called by a naval authority only a few days ago to the experience of the English officers in handling their big ships. One vessel in turning around sank another equally formidable by simply striking her with her stern. The American idea of lighter vessels, easier handled, is being carried out, and with powerful armaments are expected to be more than a match for the unwieldy hulks of English and Continental nations.

The officers of the Construction and Engineer Bureaus of the Navy Department are not only keeping abreast of the appropriations for new vessels, but are constantly moving ahead with new and improved designs for vessels in the future. In the next report of the Secretary of the Navy that progressive officer will ask for more ships according to plans which are far in advance of anything yet attained by any foreign government. These plans are kept among the confidential archives of the Department, and will be produced when Congress is ready to authorize more vessels.

The last of the vessels for which appropriations have been made and which will be built, include a torpedo cruiser, torpedo boat and a ram, are now advertised for proposals. The Thomas monitor and the duplicate of the dynamite cruiser, the original of which has not been entirely satisfactory, will not be constructed on present plans.

The six vessels authorized by the present Congress are of more elaborate and complicated designs than have yet been undertaken by the Department. The naval constructors of England and other European Governments are, therefore, watching with the deepest interest the rapid strides being made on this side of the Atlantic. The legations of leading European nations now maintain permanent naval attachés, who study and report upon the startling progress made by the United States within the

past four years as a naval power in modern vessels. The Department officers are felicitating themselves upon the very creditable fact that within less than 30 days after the adjournment of Congress they have completed the designs, issued proposals and in the larger types of vessels awarded contracts for their construction. In another 30 days they will have all the authorized work under way, with the exception of the two vessels already referred to.

The demand for iron and steel, consequent upon the marvelous activity in Government work, promises a long period of beneficial effect upon production and the markets.

The Ironmasters' Excursion.

THE SOUTHERN TOUR.

Thanks to the reputation for inflexible adherence to schedule time acquired by W. P. Shinn, chairman of the Transportation Committee, the Southern party started from Chicago promptly at 8.30, in three sections. The headquarters of C. Kirchhoff, Jr., secretary of the American Reception Committee, and of W. P. Shinn, chairman of the Reception Committee, were established in Car A of the first section. Until the last moment changes from one to the other tour took place. The actual count of the party made after starting showed its number to be 255. The trains reached Louisville safely on Wednesday morning, and after a brief stay proceeded to Nashville. The second section was delayed by a slight accident to the locomotive, so that Birmingham, Ala., was reached late at night. Many of the troubles disappeared which beset those who had charge of the arrangements to handle so large a party. Some of them arose from the inexperience of men not accustomed to American methods of railroad travel. Others grew out of the thoughtlessness of some of the guests, and only very few to a perversity which was promptly rebuked by their own associates. The German contingent was admirably managed by their officers, Alexander Thielen, chairman, and Emil Schroeder, secretary. Their military training is clearly shown in their unquestioning and prompt acceptance of suggestions to establish order. Their frank appreciation of the efforts of their hosts is a feature pleasantly and gratefully remembered by the many volunteers who gave all their time to the cause of American hospitality. Among them may be named particularly Captain A. E. Hunt, of Pittsburgh, who had charge of the second section, and W. L. Sheaffer, of Pottsville, Pa., who was Mr. Shinn's representative on the third section.

The Visit to Birmingham.

Owing to a slight accident to one of the sections north of Nashville, it was not until morning that the last of the party arrived at Birmingham. It took some time to embark the visitors on the special trains furnished them for a round of the points of interest in the vicinity of Birmingham to be visited during the first day. After carrying the guests to the limestone quarries of the Birmingham Mining and Mfg. Company, at Gate City, who supply all the furnaces of the district with excellent flux, the trains were carried along Red Mountain. Coming around a bend, the whole valley in which Birmingham lies was spread before the visitors. Since the writer last spent some time in the "Magic City," some years since, when it was on the verge of a real estate panic, fortunately averted by the wise policy of the Elyton Land Company, Birmingham has improved wonderfully in appearance. So far as could be judged during the hasty visit now

made, the town has assumed the air of conservatism which an assured position gives. A good deal of the aggressive exaggeration has disappeared. All hopes for the future seem now to be centered on the prospect of manufacturing steel by the basic process. Leading iron men of Birmingham, men abundantly able to back their convictions with capital, are very sanguine as to the outcome. To a considerable extent the subject is one new to them, and they show little inclination to be shaken by the doubts of those who have struggled with the same problem. Is it clear, however, that a determined effort will be made to test the matter.

It is in one direction, and to the unprejudiced observer it is the most significant, for Birmingham's growth, that decided progress has been made. The methods of mining ore and coal and of smelting iron have undergone notable improvement. The plants are assuming an aspect which tells of accumulated experience and of more careful work. We have frankly pointed to shortcomings in the past and gladly seize this opportunity to note the improvement made. With all its unparalleled natural advantages, iron manufacturing in Birmingham has drawbacks to overcome in the quality of its coke and the irregularity of its ores. The burden of the work has fallen upon the furnace managers, whose duties are nowhere more arduous than they are in the greatest producing center of the South. They have and are still laboring under disadvantages which only those can appreciate who have watched similar work. We question whether they have received full credit for what they have already accomplished, and for what they are still struggling for. Much could be done by closer co-operation between those who mine coal and ore and the men who are expected to produce a high average of foundry grades at a cost approaching the figures set by enthusiasts. The first ore bank reached and inspected was the Eureka, now owned and operated by the De Bardeleben Coal and Iron Company, of Bessemer. The great stripping of the outcrop at a point where formerly underground mining was carried on offered an excellent opportunity to observe at its best the Red Mountain vein. The old Eureka furnace plant at Oxmoor, which was not visited, is being remodeled.

No stop was made at the Redding mines, the trains proceeding to Adger, where the Blue Creek coal mines of the De Bardeleben Coal and Iron Company were entered by the majority of the visitors. The next run was to Blocton, where between 2200 and 2300 tons of coal are mined, and where a considerable quantity of coke is made.

In the evening a reception was tendered to the foreign guests by the Alabama Club, a feature of the evening being a series of speeches.

Friday, October 17, brought another day's busy sightseeing, the first point visited being the furnace plants, coke ovens and rolling mills at Bessemer. We have described these in the past and need only add now as a significant fact that at the Bessemer furnaces a number of plain two flue boilers were being put in, to supplement a plant of tubular boilers.

Your correspondent took occasion to pay a hasty visit to the cast iron pipe plant now being built under the supervision of A. McArthur, by Shickle, Harrison & Co., of St. Louis. The plant is being laid out on a magnificent scale, one large oblong pit being completed while others are in course of construction. Considering the brief period during which work has been under way surprising progress has been made. We understand that the company have already taken two large contracts, one for Atlanta, Ga., and the other for Butte City, Mon.

Only a brief stop was made at the Woodward furnaces, which enjoy the reputation of being the most remunerative plant in the Birmingham district. The incline hoist which was used at one of the furnaces for charging has been removed, because, as we learn, it racked the furnace too much. We observed that some of the pig beds were placed outside of the cast house, and were told that the reason was that it was found better to allow the iron to cool slowly instead of quenching it.

The great plant of the Tennessee Coal, Iron and Railway Company at Ensley, with its four furnaces, was in full blast. It is acknowledged now that their size, 80 x 20 feet, is too great for the materials used in the Birmingham district.

The next plant visited was the Pratt coal mines and coke ovens of the same company, followed by an inspection of the Pioneer Company's two furnaces at Thomas, which are considered the model stacks of the district, and enjoy the reputation of having earned dividends for their owners from the day the first cast was made. Some of the party then proceeded to the Champion brown ore mines, while others visited the steel plant of the Henderson Company, at North Birmingham.

The Birmingham local committee made extraordinary efforts for the entertainment of their guests. A very neatly bound and finely printed volume prepared by Ben Carter, under the auspices of the general committee, Frank Y. Anderson, Joseph F. Johnston, W. T. Underwood, Fred. Sloss and Joseph Hardie, was placed in the hands of every visitor, the Germans receiving a copy in their native language. The volume is an admirable piece of work, and is accompanied by a good map. Birmingham brought its best men forward to entertain its guests, the Entertainment Committee at Large consisting of H. F. De Bardeleben, Edwin Thomas, H. G. Bond, T. H. Aldrich, Thomas Seddon, Jos. H. Woodward, C. P. Williamson, A. Griggs and W. M. Newbold. Among those who assisted were T. T. Hillman, Thos. A. Mack, W. H. Hassinger, Geo. L. Morris, C. R. Claghorn, Ernst Prochaska, C. A. Meissner, J. T. Hill, H. M. Caldwell, E. F. Ensley, Maclin Sloss, W. B. Phillips, L. W. Johns, G. O. Vanderbilt, Andrew M. Adger, N. A. Bothos and E. H. Barron.

Friday evening the party again took the special trains, and during the night were conveyed without mishap to Shelby, where they were welcomed early in the morning by President Bush, of the Shelby Company; Homer R. Stoughton, whose name has been so long identified with that enterprise, and by other officers of the company. The party had stopped immediately in front of the furnace plant, one of the stacks being in blast. The great point of interest was the famous ore banks, the largest thus far developed in the South.

Starting from Shelby, delays occurred which allowed only a brief stay at Talladega, where the large coke furnace was in blast, and at Ironaton, where one of the two charcoal furnaces was blowing, which is reputed to be able to make iron cheaper than any Southern charcoal plant. Anniston, the gem of that section of the South, was finally reached at so late an hour that very little opportunity was afforded the guests to appreciate its resources and its industries. Your correspondent heard many expressions of regret from the European ironmasters.

During the night the trains made the run from Anniston to Chattanooga. The first section only arrived in time, the second and third being delayed by the derailling of the engine of the former at Dalton, Ga., and consequently the breaking of a Janney coupling some distance beyond that town.

TRADE REPORT.

Chicago.

(By Telegraph.)

Office of The Iron Age, 58 Dearborn street, CHICAGO, October 23, 1890.

Pig Iron.—Under a fair volume of business transacted last week the market is stronger to-day than it has been for several weeks past. This statement covers all classes of Iron, but is less applicable to Charcoal than any of the others. It is rumored that Charcoal Irons have been sold at \$18.50, but neither seller nor buyer can be traced, and it is altogether probable that if Charcoal Iron has been sold at less than \$19 it would hardly pass as a standard grade. There is very little that could be had at the latter figure, while the ruling price is 50¢ per ton higher. Coke Irons have been in excellent demand and prices held with greater firmness on all numbers, one maker asking an advance of 25¢ per ton on No. 3. There has been some inquiry for Ohio Soft Irons of good quality, and also an increase in the demand for Southern Foundry Iron. An attaché of one of the Chicago Pig Iron firms has recently made an inspection of the Southern furnaces and reports that they are all well sold up for this year and firm in price. Offers have been made for small lots at less than quotations without being accepted. Gray Forge and Mottled command higher prices. It is said that sales of the former made at \$14.50 cannot be duplicated this week. Buyers are not inclined to place orders for delivery beyond this year. The quantities in request are not large, but scattered through the territory in proximity to this market. The largest sale reported is 1000 tons of local Foundry. The balance range from 100 to 500 tons. Carload lots are beginning to figure more prominently in the demand than they did several months ago, showing that buyers are endeavoring to bring their stocks down to the closest possible limit at the close of the year. We make the following quotations, cash, f.o.b. Chicago: Lake Superior Charcoal, \$19 @ \$20; Local Coke Foundry, No. 1, \$17; No. 2, \$16; No. 3, \$15 @ \$15.25; American Scotch, \$18.50 @ \$19; Southern Coke, No. 1, \$16.25; No. 2, \$15.75; No. 3, \$15; Southern No. 1, Soft, \$15.75; No. 2, Soft, \$14.75; Southern Gray Forge, \$14.75; Mottled, \$14.25; Tennessee Charcoal, No. 1, \$18.50; Alabama Car Wheel, \$22.25 @ \$23.50.

Bar Iron.—The fact that manufacturers show willingness to meet buyers on round lots for delivery this year indicates weakness in the market. One sale of 300 tons is reported at 1.90¢ flat on car specifications; 1.85¢, half extras, is the ruling price, Chicago delivery, but 1.82½¢ has been named on favorable orders. There are no large buyers, but a good many sales of small lots, and inquiries for delivery extending into December. Jobbers continued the quotation from store of 1.90¢ @ 2.10¢, according to quality.

Structural Iron.—There is nothing new to report in this branch of business. The demand continues very fair and averages greater than usual for this season of the year. Quotations, f.o.b. Chicago, in carload lots, are as follows: Angles, 2.35¢ @ 2.40¢; Tees, 2.90¢ @ 3¢; Beams, 3.20¢; Universal Plates, 2.45¢ @ 2.50¢; Sheared Plates, Iron, 2.50¢ @ 2.60¢; Steel, 2.60¢ @ 2.70¢; Beams sell from store in small lots at 3.70¢, but Angles and Tees at 10¢ @ 15¢ per 100 above carload prices.

Plates, Tubes, &c.—Buyers report the market firm in price from mill. Plate makers are still full of orders and many of

them are devoting their entire capacity to rolling Skelp Iron. The demand from jobbers is very heavy in small lots. The latters' stocks are in good condition, and they are prepared to make prompt shipments. Tubes are firm and hard to get. The demand continues very heavy. Prices are still unchanged.

Black Sheets.—Some of the manufacturers are offering No. 27 Common at 3¢, but, as a rule, all mills are full of orders and demanding 3.5¢. Out of store jobbers quote 3.40¢. Refined is very scarce and firm; jobbers quote this grade at 4.10¢.

Galvanized Iron.—There is a good business doing, and it is hard to get stocks sufficient to keep up full assortment of sizes. If anything, prices are a little stronger. Jobbers quote Juniata at 60¢ and 5¢ off from store.

Steel Rails and Fastenings.—Sales for the past week have not been heavy and confined entirely to small lots. The Illinois Steel Company report a number of good orders in prospect for this year's delivery, which may be closed in the course of a few days. They continue the price of \$32 @ \$32.50 for this year's delivery. Inquiries are continuing to increase, but they still refuse to name prices. Splice Bars are reported to be a little weaker, but no change has been made in the price. Mills continue to quote 2.10¢ @ 2.20¢ on Iron and 2.25¢ @ 2.30¢ for Steel. There is a fair demand for Spikes at 2.30¢ @ 2.35¢, and some orders are placed for Track Bolts, with Hexagon Nuts, at less than former quotations. It is said that prices now range from 3¢ to 3.10¢ for immediate delivery. An advance is asked for delivery next month.

Old Rails and Wheels.—The quantity of Old Rails in sight would not be adequate to meet the demand, if prices could be agreed upon. Buyers decline to pay more than \$26.50 and sellers refuse to deliver at less than \$27. Some sales of small lots have been made at the former figure; 5000 tons are offered by a local railroad company for delivery next spring at \$27. This price is behind the limit of consumers at the present time. One sale of Old Wheels is reported at \$19. Brokers have offered \$18.75 for several lots, but holders refuse to sell. Old Steel Rails, long lengths, are offered at \$22.50, which is about 50¢ to 75¢ per ton above the price purchasers will pay. Short Pieces are weaker, and \$17.25 is all that could be obtained for them according to offers made by buyers.

Scrap Iron.—There is very little doing in the Scrap trade, and yet it appears to be more active than it was a week ago. The material offering from railroads is in small quantities and not especially desirable in assortment. Dealer's selling price per net ton on No. 1 Railroad is \$22 @ \$23; No. 1 Forge, \$21.50; No. 1 Mill, \$16 @ \$17; Fish Plates, \$24; Horse Shoes, \$21; Pipes and Flues, \$15.50; Machinery Cast, \$13.50; Wrought Turnings, \$12.50; Cast Borings, \$9; Mixed Steel, \$14; Leaf Steel, \$16; Tire Steel, \$17.

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, Pa., October 21, 1890.

There is some renewal of the unsettled feeling which prevailed a few weeks ago, causing more or less hesitation among buyers, and in some articles slightly lower prices. The position is hard to define, nevertheless. Ordinarily it would probably be safe to predict lower prices all around, but such a contingency is by no means certain now, although it looks like it. But as yet the effect of the McKinley bill is an unknown quantity. If the various projects mentioned in the daily papers are carried into effect, there will be a de-

mand for all the Iron we can produce, and for the time being a postponement of the reaction which is inevitable sooner or later. It would be useless to report all the gossip that is going the rounds on this subject. But millions upon millions of foreign capital is said to be on the point of investment in industries of almost every conceivable character. Under present conditions this is not altogether improbable, although it may well be doubted if it will be done so promptly, or to so great an extent, as to be appreciably felt in the immediate future. More likely that it will be done gradually, if at all, and after a careful study of the workings of the new bill. In endeavoring to define the course of the Iron market, however, it is impossible to ignore this feature. It may keep our mills and furnaces as fully employed on their increased output as they have been during the past several years on a smaller output. But it is not likely to do this. The chances are that production is increasing too rapidly, and that a more or less serious reaction is unavoidable, unless for some such extraneous aid as above mentioned. There is already some irregularity and some weakness, which will be more specifically detailed under the various headings, as follows:

Pig Iron.—Increased offerings have been apparent during the past week, as well as increased anxiety to realize. This does not apply to first-class standard brands, but there is more Iron on the market than there has been for some time past, and there is more Iron at lower prices. What are claimed to be good Irons can be bought at \$15, \$16 and \$17.25, delivered, for the three leading grades, and on firm offers for large lots some brands can be bought at concessions from these figures. Of course it is not to be understood that buyers can pick up their regular brands at these prices, but they are told they can get something just as good at less money. If this continues for any length of time it needs no prophet to predict the result, and there is too much reason to believe that it will continue. New brands are coming into the market—perhaps not daily, but much too often for those who would like to see uniform prices and a steady market. Consequently there is a wider range of prices than for months past. The favorite Irons are not the first to decline, but other descriptions are shaded down, until at some price somebody takes them, so much regular Iron being displaced, or, to use a common expression, "knocked out." We have already quoted new brands, although regular standards have been taken at considerably more money, say \$15 @ \$15.50, delivered, for Gray Forge, \$16.50 @ \$17 for No. 2 Foundry and \$17.25 @ \$18.25 for No. 1. Cinder Irons have been offered at very low figures, one or two lots having been taken, it is said, at about \$13.50, delivered, although \$14 is the usual asking price.

Bessemer Pig.—This specialty is not mentioned because there is any demand, but for the reason that there is no demand, and therefore no reliable quotations. Nominal figures would probably be \$18 @ \$18.50, at furnace, asked. What buyers would pay is even more problematical, as they have made no offers of late.

Steel Billets.—The market is very much unsettled and prices hard to quote with exactness. The last sale reported was Nail Slabs at \$30.50, delivered, and Billets at \$31, but buyers have reduced their bids and now talk not over \$29.50, delivered, for Slabs, and \$30 for 4 x 4 Billets. This does not fix the market, of course, but consumers have got their ideas down, and are not likely to change so long as sellers show their anxiety to do business at constantly declining prices.

There are some inquiries, however, from important concerns, and if prices can be arranged it is not unlikely that lots of from 2000 to 5000 or 10,000 tons each would be taken. The parties want to buy, but mention extremely low figures, and say they can wait if their bids are not acceptable to makers.

Steel Rails.—The market is very weak, and well authenticated statements are to the effect that \$29 has been shaded by some of the mills in the Western part of the State. One mill, in fact, lost business at \$28.75, presumably because the order was placed elsewhere at less money. Large orders are very scarce, however, and while \$20, at mill, is quoted on small lots, bids of 50¢ or a dollar less money would not be likely to wait long for a taker. Work for winter and spring is being sought for somewhat anxiously, so that large cash buyers have special inducements for placing orders at this time.

Muck Bars.—Are in precisely the same condition as noted for several weeks past—viz.: \$39 at sellers' mill asked, with the same figure bid delivered in buyers' yards. Mills full of work for some time to come, and so far as known no sales have been made around here since date of our last report.

Bar Iron.—There is a continued good demand and prices are fully maintained at 1.85¢ @ 1.90¢ at city mills and about 1.80¢ at points in the interior. There are no special features, unless it be that the demand is of a well distributed character, and not confined to any particular class of trade. Consumers are all crowded with work, and while they are not placing orders for large lots, the run of small orders keeps everything in the highest condition of activity, and from present appearances bids fair to continue so indefinitely.

Skelp Iron.—There is plenty of business for those who can make early deliveries. Several sales of this character have been reported during the week at about 2¢, delivered, for Grooved, and 2.20¢ for Sheared, although it is not unlikely that there will be less urgency in the demand as soon as the cold weather sets in.

Plates.—The mills are still pretty full of work, although in a few instances there are indications that orders are not as abundant as they were in some departments, so that prices are a little irregular. There is nothing that can be called weak, but top figures are less frequently quoted, while the inside rates are shaded a little sooner than risk the loss of something very desirable. General quotations for lots delivered in consumers' yards are about as follows:

	Iron.	Steel.
Ship Plates.....	2.25 @ 2.30¢	2.40 @ 2.50¢
Tank.....	2.25 @ 2.30¢	2.40 @ 2.50¢
Bridge Plate.....	2.30 @ 2.40¢	2.50 @ 2.60¢
Shell.....	2.45 @ 2.55¢	2.65 @ 2.75¢
Flange.....	3.10 @ 3.20¢	2.90 @ 3.00¢
Fire-Box.....	3.75¢	3.75 @ 4.25¢

Structural Material.—Mills are very busy on old contracts, so that, while there has been nothing important placed recently, there is plenty of work to go on with—enough in most cases to enable them to run full to the end of the year. Prices steady as last quoted—viz., for lots delivered in consumers' yards: Angles, 2.20¢ @ 2.30¢; Sheared Plates, 2.40¢ @ 2.50¢, and from 10¢ to 20¢ more for Steel, according to requirements. Tees, 2.7¢ @ 2.8¢; Beams and Channels, 3.1¢ for either Iron or Steel.

Old Rails.—Demand rather languid, but with very small supplies. Prices are maintained at about \$26 @ \$26.25, delivered, at mills near by. Lots to arrive are offered at \$26, Philadelphia, but buyers talk \$25 @ \$25.25, without making firm offers.

Sheet Iron.—Business is very active and deliveries in many cases very much

behind what buyers require. Prices firm, and for carload lots usually quoted as follows:

Best Refined, Nos. 14 to 20.....	3.00¢ @ 3.10¢
Best Refined, Nos. 21 to 24.....	3.20¢ @ 3.30¢
Best Refined, Nos. 25 to 26.....	3.40¢ @ 3.50¢
Best Refined, No. 27.....	3.50¢ @ 3.60¢
Best Refined, No. 28.....	3.60¢ @ 3.70¢
Common, ¼¢ less than the above.	
Best Soft Steel, Nos. 14 to 20.....	3.1¼¢ @ 3¼¢
Best Soft Steel, Nos. 21 to 24.....	3.3¼¢ @ 3½¢
Best Soft Steel, Nos. 25 to 26.....	3.5¼¢ @ 3¾¢
Best Soft Steel, Nos. 27 to 28.....	3.7¼¢ @ 4¼¢
Best Bloom Sheets, 1-10¢ extra over the above prices.	
Best Bloom, Galvanized, discount.....	@ 60¢
Common, discount.....	62½¢ @ 65¢

Scrap Iron.—There is very little good Scrap available, so that holders are asking more money. Extreme figures have been paid for choice lots, with indications of further stiffening in the near future. Present quotations about as follows, No. 1 Railroad Scrap, \$22.50 @ \$23, Philadelphia, or for deliveries at mills in the interior \$22.50 @ \$23.50, according to quality and point for delivery; \$15 @ \$16 for No. 2 Light; \$16 @ \$17 for best Machinery Scrap, \$15 @ \$15.50 for ordinary, \$15.50 @ \$16.50 for Wrought Turnings, \$11 @ \$11.50 for Cast Borings, and nominally \$26 to \$28 for Old Fish Plates, and \$17 @ \$18 for Old Car Wheels.

Wrought Iron Pipe.—There is a continued good demand. Mills are busily engaged on contracts, while jobbers report considerable activity in the smaller trade. Discounts unchanged, as follows: Butt-Welded Black, 47½¢; Butt-Welded Galvanized, 40¢; Lap-Welded Black, 60¢; Lap-Welded Galvanized, 47½¢; Boiler Tubes, 1¼ inches and smaller, 45¢; 2 inches and larger, 50¢; Oil Well Casings, 50¢.

Rogers, Brown & Co., of Cincinnati and St. Louis, have opened an office (under the management of J. M. Warner) in the Bullitt Building, this city, for the accommodation and further extension of their Eastern trade. Mr. Warner informs us that they will have for sale a full line of Lake Superior Charcoal Irons, as well as the product of a number of Coke furnaces in Alabama and Tennessee.

The Lukens Iron and Steel Company, of Coatesville, Pa., have also opened an office in the Bullitt Building, which it is expected will be a great convenience to their trade in and around Philadelphia. The mills at Coatesville are employed pretty much to their full capacity. Among their recent orders is one for Boiler Iron 1½ inch for the steamships Indiana and Illinois, of the American Line. The company are building a new shipping house 120 x 60, also one for electric light and general supplies.

Cleveland.

CLEVELAND, October 20, 1890.

Iron Ore.—The situation in the Iron Ore market is somewhat peculiar. The demand is excessive, but there seems to be but a very little, if any, Ore to be had anywhere at any price. Quotations are reported to be higher, but this really signifies nothing, since there is no Ore to sell. A resale of 10,000 tons of non-Bessemer (relinquished by a firm intending to manufacture Steel hereafter) is reported at prices equivalent to \$4.40 f.o.b. vessels Cleveland, or about 15¢ or 20¢ more per ton than was paid for the Ore one year ago. Receipts at lower lake ports up to date exceed 6,800,000 tons, while the shipments from the Lake Superior mines must have considerably gone above the 7,000,000 ton mark. Last season the stampede of vessels to get into commission for the Ore carrying trade did not occur until late in the year, and the quantity brought forward in October and November was enor-

mous. This year there has been a continuous rush. For this reason, and also because of the strikes at certain mines, it is difficult to estimate the increase of the output of 1890 over that of 1889. Up to date, however, the receipts are about 1,000,000 tons in excess of those on October 20, 1889. Dealers without an exception report demands for new Ores that they are powerless to fill. The railroads are having somewhat better success in relieving the crush on the lake docks, and the quantity of Ore now going to the furnaces is very large.

Pig Iron.—Although dealers ask to be put on record as entertaining the brightest of hopes for the future, there is really no change of any consequence in the situation here. The demand for Ohio Silveries noted two weeks ago continues, and prices are slightly higher and more firm. On the other hand, sales of Bessemer are reported at \$17, cash, at the furnace, and of No. 1 Foundry at \$16.50. Many sales are reported, but the amount involved in each instance is trifling. This seems peculiar when the great amount of Iron going into consumption is considered, and when it is also remembered that all Pig Iron products are in better favor and commanding better prices than for many months past. There seems to be no reason to doubt, however, that a change for the better is not far away. The new Tariff bill is regarded very favorably in all Iron circles, and its beneficial effects will soon be felt.

Manufactured Iron.—Business continues very brisk. Bar Iron is still quoted at 1.80¢, although sales are reported at 1.75¢. Muck Bar is in good demand, and Sheets of all numbers are commanding big prices.

Nails.—The market is rather quiet and prices are slightly lower. Steel Cut Nails are now quoted at \$1.90, Steel Cut Spikes at \$2.15.

Scrap.—No. 1 Railroad Wrought is in excellent demand at \$22 @ \$22.50. For No. 1 Wrought Turnings \$14 @ \$14.50 is quoted; for old Axles, \$28; for Old Car Wheels, \$18, and for Machinery Cast, \$13.

Coke.—There is still a great scarcity of cars, and furnacemen are complaining quite bitterly. There has been plenty of talk of higher prices, but quotations are unchanged.

Old Rails.—A sale of Old American Rails at \$27.50 is reported.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, October 23, 1890.

Pig Iron.—But few, if any, new features have been developed in the Iron outlook, as seen from a local standpoint during the past week. The aggregate business as well as the individual sales have been small, or at least only moderate, and the conflicting influences affecting prices have counteracted one another, leaving the range of prices unchanged. Latest statistical information makes the decrease in stocks at furnace even greater than previously reported, and shipments from furnace yards have continued heavy. Consumption has continued large, with all industrial plants busy, and many in special lines overflowing with work. The statistical situation, therefore, is a strong one, and the producing companies of Pig Iron who have advanced prices because of oversold condition show no indication of rescinding action taken in this respect. On the other hand, other furnaces are not so heavily oversold, and new plants anxious to gain a secure foothold in the markets, have taken no steps to follow the initiative taken by the larger furnaces, but, on the contrary, under the stimulus of active com-

petition have continued to sell at previous prices, if not at reduced rates. The demand now is mainly, in fact almost exclusively, for next year's delivery, at least running several months into next year, even when beginning now or at any time prior to January, and a fact in favor of the buyer seems to be the willingness, although affectedly reluctant, of the furnaces to sell for long delivery at present current prices. The liberal inquiries which gave tone to the market a week ago have not yet given birth to large trades, but a few of them have proved productive, and others will probably bear fruit. The scene of the largest transactions has been transferred to Southern territory, but some trades of moment have been consummated in the East. At the close some important business is reported in progress in the Northwest. Sales made during the week will scarcely aggregate 15,000 tons, and mainly in smaller moderate amounts. Among the most important are 1500, 500, and several 100 ton lots of Mottled, 800 and 1000 tons Gray Forge, 500 tons No. 1 Soft and 300 tons No. 2 Soft, all Southern Coke, on basis of inside quotations. We quote the prices current for cash, f.o.b. Cincinnati, as follows:

Foundry.	
Southern Coke, No. 1.....	\$15.25 @ \$15.75
Southern Coke, No. 2.....	14.25 @ 14.50
Southern Coke, No. 3.....	13.75 @ 14.00
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	16.00 @ 16.50
Maboning and Shenandoah Valley.....	17.50 @ 18.00
Hanging Rock Charcoal, No. 1.....	21.00 @ 22.00
Hanging Rock Charcoal, No. 2.....	19.50 @ 20.50
Tennessee and Alabama Charcoal, No. 1.....	18.00 @ 19.00
Tennessee and Alabama Charcoal, No. 2.....	18.50 @ 19.50
Forge.	
Gray Forge.....	13.25 @ 13.50
Mottled Neutral Coke.....	12.75 @ 13.00
Car Wheel and Malleable Irons.	
Southern Car Wheel.....	22.50 @ 23.50
Hanging Rock, Cold Blast.....	22.00 @ 22.50
Lake Superior Car Wheel and Malleable.....	21.00 @ 22.00

Louisville.

LOUISVILLE, KY., October 20, 1890.

Pig Iron.—During the first part of the week the buying was not active, but towards the close inquiries for several large orders have been divided between deliveries for this year and for six months of the coming. Consumption seems to be fully up to the production and a little in excess, and this has caused one or two large companies to advance their price now 25¢, making Gray Forge basis \$10.75 at furnace. It is felt that this price can be maintained, and that sales at \$11 for Gray Forge will be made before long. As consumption continues unprecedented and large consumers like rolling mills and pipe companies report an unusual amount of work on hand and in sight, the indications are for a steady trade for the fall and the beginning of next year, with prices tending toward a higher basis. The strength of the market is unusual when one considers the tightness of money; it is felt that there are no other serious obstacles to overcome and check, and there will continue a strong feeling for several months to come. We quote:

Southern Coke, No. 1 Foundry....	\$14.75 @ \$15.25
Southern Coke, No. 2 Foundry....	14.25 @ 14.75
Southern Coke, No. 3 Foundry....	13.75 @ 14.25
Southern Coke, Gray Forge.....	13.25 @ 13.75
Southern Coke, Silver Gray.....	14.00 @ 15.00
Southern Charcoal, No. 1 Foundry.....	17.50 @ 18.50
Southern Car Wheel.....	22.50 @ 23.50

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, October 20, 1890.

Pig Iron.—There is no particular change to note since the slight advance that was made a week or two ago. There are no stocks accumulating at the furnaces. The demand is good, and the consumption of

Iron all over the country is very great at the present time, but at the same time there is a great deal of Iron being made. There are a few furnaces out through the South, but only for repairs, and they are being put in order again as fast as practicable.

St. Louis.

OFFICE OF *The Iron Age*, 214 N. Sixth st., ST. LOUIS, October 20, 1890.

Pig Iron.—There is no special change to note in the condition of the market since our last report. A moderate business is being transacted, and orders are generally for lots of from 50 to 100 tons. There is a trifle more steadiness than was noticeable a week or ten days ago, which is accounted for to a certain extent by the fact that some grades, especially No. 1 and No. 2 Foundry, are decidedly scarce, and some furnaces have withdrawn quotations on these grades. Gray Forge and Mottled Irons have been moving quite freely at current quotations. There are one or two fair sized deals now in progress which call for from 1000 to 1500 tons of Iron. It is expected that the orders will be placed in the course of the next few day. Consumers of Iron who have orders placed ahead for deliveries during November and December are asking for delivery earlier than the time specified, indicating a degree of prosperity that is unusual at this period of the year. Indications point to a continuance of the present range of prices, and as most of the Southern furnaces are well sold up to January 1st, it is not probable that the prices quoted herewith will be shaded to any great extent. We quote as follows for cash, f. o. b. St. Louis

Southern Coke, No. 1 Foundry.....	\$15.75 @ \$16.25
Southern Coke, No. 2 Foundry.....	14.75 @ 15.25
Southern Coke, No. 3 Foundry.....	14.25 @ 14.75
Gray Forge.....	13.75 @ 14.25
Southern Charcoal, No. 1	
Foundry.....	17.50 @ 18.00
Southern Charcoal, No. 2	
Foundry.....	17.00 @ 17.50
Missouri Charcoal, No. 1	
Foundry.....	16.00 @ 16.50
Missouri Charcoal, No. 2	
Foundry.....	15.50 @ 16.00
Ohio Softeners.....	18.00 @ 19.00

Bar Iron.—There is no change to report concerning this department. Mills are kept steadily employed, and as the car works are well filled with orders, it seems quite reasonable to suppose that the present activity will continue and that the prices now quoted will be adhered to. Lots from mill are quoted at 1.95¢; small lots from store command from 2.10¢ to 2.15¢.

Barb Wire.—As is usual at this season of the year, the demand is only moderate, although mills are able to market their product without much difficulty. For ordinary sized lots Painted Wire is quoted at 2.90¢, with 60¢ additional for Galvanized; Carload lots, 10¢ @ cwt. less than above prices.

(By Telegraph.)

There is some improvement in the condition of the Pig Iron trade. A sale of 1000 tons No. 2 Foundry is reported on the basis of \$11, Birmingham. In Barb Wire the feeling is somewhat easier. Mills are out with a new card rate, quoting small lots of Painted at 2.80¢ less 5¢ @ cwt. for car lots. Wire Nails are freely offered at \$2.50 rate.

Detroit.

WILLIAM F. JARVIS & Co., Detroit, Mich., under date October 20, 1890, reports the market as follows: There is an

increased demand for low-grade Southern Iron. Buyers seem finally alive to the fact that the market is about as low as it is possible for it to be. Added to this the known falling off of supply on hand of about 50,000 tons of Coke Iron in the month of September is forcing early buying. Again, it is exceedingly difficult to obtain cars, and prompt deliveries are asked for. In consequence a much more active week has been seen. No material change in figures can be noted, however, but the sellers are gaining in firmness every day. Jackson County Silvery Irons are scarce, at full figures. Lake Superior Charcoal has seen but few transactions, the larger buyers having already placed all or nearly all of their orders, the delivery of which will be generally completed by December 1, the close of lake navigation. Manufactured Iron of nearly every description is in good demand, at firm figures, and prompt deliveries are hard to obtain. We quote the market to day as follows:

Lake Superior Charcoal, all num-	
bers.....	\$20.00 @ \$20.50
Lake Superior Coke, Bessemer....	18.50 @ 18.75
Katahdin (Maine Charcoal).....	23.50 @ 24.00
Lake Superior Coke, all ore.....	18.50 @ 19.50
Ohio Black Band (40 per cent.)....	18.25 @ 18.75
Southern No. 1.....	16.50 @ 17.00
Southern Gray Forge.....	14.50 @ 15.00
Jackson County (Ohio) Silvery, No. 1.....	19.00 @ 19.50
Connellsville Coke.....	4.80

New York.

Office of *The Iron Age*, 66 and 68 Duane street, NEW YORK, October 22, 1890.

American Pig Iron.—During the week under review no sensational or disturbing events have transpired, and the little furore occasioned by the break made a short time ago by the local agents of a prominent Southern company seems to have died out. At present there is merely the routine demand, yet no pressure to sell any reputable brand of either Northern or Southern product is noticeable, and values have a good measure of support all along the line. Current production of high grade Foundry Pig seems to be closely taken up in meeting deliveries on contracts in hand. The lower grades of Foundry Pig are also in very fair position, although not as favorably situated as the better qualities, and Mill grades may be said to be fairly holding their own. In any event evidence is wanting of anxiety on the part of sellers, or of any considerable accumulation of supplies at shipping points or on furnace banks. It is the fact, however, that consumers are content with looking after immediate wants and leaving the future a matter for later consideration. We quote \$17.50 @ \$18 for No. 1 and \$16 @ \$16.50 for No. 2 Foundry, good Northern brands; \$17 @ \$17.50 for No. 1, \$16 @ \$16.50 for No. 2 and \$14.75 @ \$15.25 for No. 3 Southern.

Spiegeleisen and Ferromanganese.—In this line there has been no change. The demand is moderate, sellers offer no new inducements and consumers are slow about entering into negotiations for contracts for future supplies in view of the unsettled condition of the market for various steel products. Twenty per cent. Spiegeleisen is quoted at \$30.50 @ \$31 for German and \$31 @ \$31.50 for English; and 80 % Ferromanganese at \$70 for future delivery.

Steel Rails.—Apart from unimportant sales for early delivery no business is reported, and, by all accounts, attractive orders are still few and far between. Local agents have manifested no inclination to expedite the business pending the results of the manufacturers' meeting, and prices for forward deliveries are momentarily a matter of uncertainty. The basis of \$30 at Eastern mill for standard sections is generally quoted in response to inquiries for Rails for delivery during the next two months.

Steel Billets.—The mills are well employed on old orders. Little new business is coming up, however, and market value is therefore difficult to arrive at with any accuracy. Western mill prices are about \$28.50 @ \$29, standard sizes, and \$30 is the "nominal" rate at Eastern mills.

Steel Wire Rods.—There has been no change in the market for American Rods, and the high cost of importations still checks operations in foreign. About \$43 @ \$43.50, at Eastern mills, and \$41 @ \$41.50, at Western mills, may fairly be quoted, but these are merely "nominal" figures.

Structural Iron and Steel.—No change is visible in this line. Mills are well employed and prices remain steady, but not a great deal of new business comes forward. We quote at 2.25¢ for Universal Mill Plates, delivered; 2.10¢ @ 2.25¢ for Angles; 2.60¢ @ 2.70¢ for Tees, and 3.1¢ for Beams.

Old Rails.—The market remains quiet. Tees may be obtained at \$26 without difficulty, probably at \$25.50 on cars; but inquiries are few, and bids of over \$25 very rare.

Scrap Iron.—Wrought Scrap has limited call, and \$21.50 @ \$22, f.o.b. cars, is doubtless full value for No. 1. Car Wheels are still quoted at \$18 here, with little, if anything, doing.

Warrant Stocks.—The American Pig Iron Storage Warrant Company report as follows:

	Tons.
Stock in yard, October 15.....	65,300
Put in yard six days ending October 21.....	100
Total.....	65,400
Withdrawn six days ending October 21.....	200
Net stock in yard, October 21.....	65,200

Financial.

Trade conditions throughout the country are reported favorable, so far as the correspondence of merchants affords any indication, as the consuming public seems to be well provided with money. Among dry goods jobbers there is already a good demand for spring fabrics, and the market tone is strong. The new tariff operates to disconcert buyers in some instances, as prices are not yet fixed. The future of the money market is more or less the subject of discussion among the brokerage fraternity, some of whom are on guard against a speculative squeeze, while others see relief in the diminished Treasury receipts and the probability that large amounts will soon return from the West and South. At present time money is far from being in full supply, some of the banks having contracted their loans. A favorable circumstance was that the Bank of England made no change in the rate of discount. In Wall street the principal bear argument is the inability of railroad companies to maintain rates. The Interstate Commerce law and agreements of railroad associations are alike proclaimed as worthless. The clearings of 50 cities for the week show an increase of 6.6%. New York gained 2.5%. The increase is most noticeable at Chicago, Pittsburgh, Buffalo and Galveston.

The stock market on Friday, for the first time since the present downward movement commenced, showed signs of rallying, there being a few buying orders on European account, and the favorable showing by the Northern Pacific's annual report stimulated purchases of the Villard specialties. On Saturday the market yielded slightly under the pressure of an unfavorable bank statement, but at the close another small gain was recorded. The advance in the grang-

ers was aided by news of a restoration of rates, to take effect November 1. On Monday there was a slump, the market being weak and feverish, with realizing sales, both local and foreign. Union Pacific was sold, it was reported, on account of apprehensions that a large amount of money will have to be spent in order to compete successfully with the Northern Pacific in and about Tacoma. While the Union Pacific is hurriedly building a line from Portland to Tacoma the Northern Pacific is occupying valuable territory in every direction in the Puget Sound country, and has now in the course of construction about 400 miles of branches. Silver bullion certificates were heavy and a shade lower.

Government bonds were firm. Quotations as follows:

U. S. 4½, 1891, registered.....	104½
U. S. 4½, 1891, coupon.....	104½
U. S. 4s, 1907, registered.....	123½
U. S. 4s, 1907, coupon.....	123½
U. S. currency 6s, 1896.....	113

The weekly bank statement shows a decrease in reserve of \$3,504,450, which not only wipes out the surplus previously held in excess of legal requirements, but leaves a deficiency of \$349,220. The decrease in specie was \$4,737,700; in deposits, \$3,224,600, and in loans, \$710,400. Currency shipments were chiefly to the West, though the South continued to absorb large amounts.

Money on call was 4% @ 5%. Time money 6% for all periods. The demand for commercial paper is light. Prime indorsed bills receivable are quoted at 6%, and first class single name paper at 7%.

Sterling exchange quiet and steady. Posted rates \$4.81 @ \$4.81½ @ \$4.86½. The London *Economist*, in remarking upon the low reserves of the Bank of England, refers to the difficulty in obtaining gold either in London or Paris, and intimates that it is possible shipments may be made from the United States as the first effect of the new Tariff bill. "The ultimate effect," the writer remarks, "will probably be very different, for, by enhancing the prices of commodities by causing large investments of capital in founding new or extending existing manufactures, and by stimulating speculation, it will tend to make money dearer rather than cheaper." Should the Austro-Hungarian Bank proceed to convert a portion of its stock of silver into gold, as already decided upon, it will be more difficult for the Bank of England to maintain an adequate stock of the metal. It is officially announced that the total subscription for the \$5,000,000 8% preferred stock of the National Cordage Company amounted to \$6,500,000. The allotment is about 80%.

The State banking system is growing in public confidence, so that the question is beginning to be raised whether the national system, with its "law ridden institutions," can much longer afford to compete. Taking the whole period of 16 years, the State system shows a growth in capital of 216%, while that of the national has increased only 19.8%. An almost equal disparity, as between the two systems, is shown in the item of deposits. Equally with respect to loans and discounts the State system shows a rate of increase out of all proportion to that of the national system. The notion that the national banks carry relatively much larger cash funds than the State and that they are therefore correspondingly safer is contradicted by the facts. It is seen from a comparison that the average ratio of cash to deposits, for the last 16 years, has been, in the case of the State banks, 24.75% and in that of the national banks only 19.65%.

Exports of merchandise from this port last week dropped to \$8,333,000, which, however, is more than \$1,000,000 in excess compared with the corresponding

week last year. Imports amounted to \$11,094,000. The principal exports are cotton, petroleum, lard, cut meats and tobacco.

Metal Market.

Pig Tin.—The market has been unsettled and irregular throughout the week, and at this writing is in a position that affords neither buyers or sellers any encouragement. In other words, London manipulations are the controlling influence and have a restraining effect upon local speculation, as well as upon trade purchases in excess of imperative wants. Straits have been offered at as low as 21.15¢, and was sold at as high as 21.85¢, net cash, during the week. The supply on the spot and due to arrive during the coming week is represented as being sufficient to meet the probable requirements for home consumption during November, and there does not appear to be much "short" interest in the market. On Wednesday values were fairly nominal at 21½¢, cash, for 5-ton lots, and \$21.60¢ @ 21.70¢ for jobbing quantities. October, November and December deliveries were offered at 21.40¢, net.

Pig Lead.—Values of domestic Pig have been variable, and the market is in a somewhat unsettled condition at the present time. There is little or nothing doing in a speculative way. Consumers are buying very cautiously, and while the uncertainty as to foreign supplies is a potent factor, it would seem that the domestic article cannot be secured for delivery during the next 60 days at prices as low as were named in some instances a few days ago. At present 5.75¢ is considered close value for deliveries during the balance of the month and 5.50¢ for November or December. A few hundred tons of foreign have been purchased at 5.20¢ @ 5.25¢, immediate shipment from abroad, and, according to latest quotations by cable, purchases could be duplicated at those figures for late November or December delivery. In fact, there were rumors of business at less than 5.20¢, landed here.

Copper.—There has been no business of importance in this metal during the past week, nor has anything transpired in the way of important new demand from any quarter. Those consumers who have not made provision for their probable requirements during the balance of the year manifest no uneasiness, and there is no indication of any anxiety to sell on the part of the mining companies. As for speculative interest, there is practically none at the present time. The mining companies, to all accounts, hold firmly at 17¢ for Lake Superior Ingots, but outside lots at ½¢ less find very few takers. Arizona Ingot remains at about 15½¢, and for common casting Copper the range of 14¢ @ 14½¢ is still quoted.

Spelter.—Western Spelter for prompt delivery appears to be very scarce and for prime brands 6.05¢ @ 6.10¢ is quoted, with sales at the inside figures. Future shipments are quoted at 5.95¢ @ 6¢, with offerings restricted to single carload lots. The demand at present is moderate, but with rarely more than single carload lots offered the market preserves a very firm tone.

Antimony.—There has been little or no movement, apart from the ordinary jobbing distribution, and prices are still irregular, with 19½¢ quoted for Hallet's and 20½¢ for Cookson's.

Tin Plate.—Prices have held very firmly in the foreign market, and future deliveries cannot be purchased at any shading of the prices that ruled a week ago. Heavy arrivals have increased spot supplies more or less, however, and this fact, along with some anxiety to realize profits

and a rather slow demand, has a temporary slight depression upon spot values. As a matter of fact, there is no uniformity to spot prices at the moment and all quotations are "nominal" in a great measure. The prices named for round lots on the spot are as follows: Coke Tins—Penlan grade, IC, 14 x 20, \$5.37½ @ \$5.40; J. B. grade, do., \$5.45. Bessemer do., \$5.45. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.45; Siemens Steel, IC basis, \$5.50; IX basis, \$6.50. IC Charcoals—Calland grade, IX, —; Melyn grade, \$6.12½ @ \$6.25; for each additional X add \$1.50; Allaway grade, \$5.87½; Grange grade, \$6; for each additional X add \$1. Charcoal Tertres—Worcester, 14 x 20, \$5.50; 20 x 28, \$10.78½; M. F., 14 x 20, \$7.90 @ \$8; do., 20 x 28, —; Dean 14 x 20, \$5.12½ @ \$5.25; do., 20 x 28, \$10.25 @ \$10.40; D. R. D. grade, 14 x 20, \$4.85 @ \$4.90; do., 20 x 28, \$9.75 @ \$9.87½; Mansel, 14 x 20, \$4.95 @ \$5; do., 20 x 28, \$10; Alyn, 14 x 20, \$5.12½; do., 20 x 28, \$10; Dyffryn, 14 x 20, \$5.75; do., 20 x 28, \$10.50; Wasters—S. T. P. grade, 14 x 20, \$4.65; do., 20 x 28, \$9.50; Abercarne grade, 14 x 20, \$4.60; do., 20 x 28, \$9.50.

New York Metal Exchange.

The following sales are reported:

THURSDAY, October 16.	
50 tons Tin, January.....	21.35¢
TUESDAY, October 21.	
10 tons Tin, October.....	21.40¢
10 tons Tin, October.....	21.45¢
10 tons Tin, January.....	21.35¢

Coal Market.

The Anthracite Coal trade is disappointing, for while large amounts of Coal are moving off at old prices, ostensibly on former contracts, the amount of new business fails to realize expectations. October is put down among the busy months, but buyers manifest a disposition to delay purchases, apparently in hopes of easier terms. Although there has been some talk of higher prices November 1, an advance is not deemed probable. The local retail trade is active and must soon make an impression on accumulated stocks. The stock in hands of wholesale operators is believed to be about equal to that of one year ago. It is said to be the policy of the companies to pile up Coal in preparation for possible emergencies. In several instances large interior yards have been established, easily accessible from the seaboard. The past week's production foots up 846,960 tons; total for the year, 26,657,843 tons, an increase of 417,715 tons over last year. The Pennsylvania Railroad tonnage for the week was 225,964 tons of Coal and 96,382 tons of Coke. The Pennsylvania's Coal tonnage for the year foots up 9,141,000 tons, an increase of 835,000 tons. Reading reports for the week 185,000 tons, of which 23,000 were sent to Port Liberty. The demand for manufacturing sizes is particularly active, Pea and Buckwheat being in demand at firm prices. Quotations are: Broken, \$3.75; Egg, \$3.90; Stove, \$4.30; Chestnut, \$3.95.

Bituminous Coal is favorably affected by the activity in leading industries, and prices are represented to be nearer the official schedule than for some time. The pool quotation is \$3.25, f.o.b. Vessel freights continue low. Cumberland reports for the week 83,000 tons.

The Lehigh Valley Railroad Company have made a purchase of 400 acres at South Plainfield, and will erect the great Coal storage plant long contemplated.

A shipment of 700 tons of Pocahontas Coal was made at Norfolk, 20th inst., to London. The Pennsylvania, Poughkeepsie and Boston Railroad has acquired a connection with the Poughkeepsie Bridge.

A large excursion party, guests of the Lehigh Valley Railroad, last week visited the Anthracite Coal regions at Pottsville, Hazleton, Wilkesbarre, &c., including the great mining plant of Coxe Bros., at Drifton.

A new feature at Weehawken is an endless chain conveyor, manufactured by the Link Belt Engineering Company, of New York, and introduced by the Ontario and Western Railroad Company. The entire length is 500 feet, of which 300 feet is on a level with the pockets. The capacity is 4 tons a minute.

A meeting of the trade, which may be important, will be held next Tuesday.

Pittsburgh.

Office of The Iron Age, Hamilton Building, {
PITTSBURGH, October 21, 1890. }

Pig Iron.—The market continues in an unsettled condition, with small demand. Consumers still refuse to buy beyond their immediate wants. Production has been reduced somewhat within the past week or two, several furnaces having been forced to bank up for want of coke, and others have blown out to reline; a good many furnaces are well sold up, and for the time are not offering to sell; others, again, who would sell, are refusing to accept current prices, which we quote as follows:

Neutral Gray Forge.....	\$14.75 @ \$15.25, cash.
All Ore Mill.....	15.50 @ 16.00, "
White and Mottled.....	14.25 @ 14.50, "
No. 1 Foundry.....	17.00 @ 17.25, "
No. 2 Foundry.....	16.00 @ 16.50, "
No. 3 Foundry.....	15.50 @ 15.75, "
No. 2 Charcoal Foundry.....	21.50 @ 22.00, "
Cold Blast Charcoal.....	27.00 @ 30.00, "
Bessemer Iron.....	17.50 @ 18.00, "

In regard to Bessemer the effort to bear the market continues. A sale of 3000 tons was reported at \$17.25, cash, which is believed to have been a trade, one party furnishing the Iron at a certain price, while the other converted it into Billets at a certain other price. Operations of this character do not represent the market and should not be reported. Furnacemen generally are asking \$18, cash, and many of them are refusing to sell for less. A city furnace reported having declined an order at \$17.75, cash. However, there are some few lots of Bessemer in second hands, and some of these are being offered for less, and can be bought at \$17.50 @ \$17.75, cash.

Muck Bar.—There appears to be no abatement in demand, and the market is active and strong at \$31.50 for immediate delivery and \$31 for winter months; we are advised of sales for this month at \$31.25; a line of 500 tons a month was reported from January to March at \$31. The demand comes largely from mills making Skelp Iron, who have large contracts, apprehensive of a shortage of gas for fuel. Some of the mills are having a great deal of trouble by shortage of gas.

Ferromanganese.—We are reported small sales of 80% Domestic at \$72 for immediate delivery. Sales of 80% Foreign are reported at \$68 @ \$70, delivered in Pittsburgh. The market appears to be in a somewhat demoralized condition. Consumers are holding off, while sellers of Foreign are anxious to sell.

Manufactured Iron.—There is a continued good demand for Manufactured Iron of all kinds and shapes; the mills have all they can do, and many of them are considerably behind. Not for many years have the mills been so busy as this year, and this, in connection with the low price of Pig Iron, puts them in better condition than usual. As stated in our last report, it is now difficult to place an order of any magnitude in this market at the present time for immediate delivery. We quote prices as before: Common Bars, 1.85¢ @ 1.90¢; Tank and Plate Iron, 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @

2.90¢; Grooved Skelp, 1.85¢ @ 1.90¢; Sheared Skelp, 2.20¢ @ 2.25¢, all 60 days, 2 % off for cash.

Nails.—There is but little doing here in Cut Nails, except in a jobbing way; there are none being made, and those that are jobbed are bought at Wheeling or in the valleys. Pittsburgh is not much of an authority now as regards Cut Nails, as manufacturers here of late years have been dropping out of the Nail business and turning their attention to something in which there is more money. The three factories running on Wire Nails are all in operation, and a good demand is reported at the price noted in our last report, viz: \$2.25 in car lots at maker's factory, 60 days, 2 % off for cash.

Wrought Iron Pipe.—The activity in this department of the Iron business noted for some time past continues. Mills are all very much pressed. No change in prices. Discounts on Black Butt, 47½ %; on Galvanized do, 40 %; on Black Lap 60 %; on Galvanized do, 47½ %; Boiler Tubes, 1¼ inches and smaller, 45 %; 2-inch and larger, 50 %; Casing, all sizes, 50 %.

Old Rails.—There have been no sales of Old Iron Rails reported for a couple of weeks, and there appears to be no demand in this market. A broker having a lot to sell reports having made a thorough canvass, and was unable to find a single buyer. Consumers out in the Shenango and Mahoning valleys appear to be pretty well supplied for the present, and it is not easy making sales there just now. However, it is probable there will be an improved demand before long. We continue to quote, in the absence of sales, at \$27.50 @ \$28. Old Steel Rails are also reported dull; for remelting purposes may be quoted at \$19.50 @ \$20.50, with no demand. For full lengths, to be used for relaying or buildings, higher prices than those quoted are being realized.

Merchant Steel.—Manufacturers report a fair business at unchanged prices: Tool Steel, 8¢ and upward; Crucible Spring Steel, 4¢; Crucible Machinery Steel, 5¢; Open Hearth Steel, base sizes, 2¼¢ @ 3¢; Bessemer Machinery Steel, 2.40¢ rates; Tire Steel, 2.55¢ rates.

Billets and Slabs.—We have to report a continued weak and unsettled market for Billets, buyers holding off in anticipation of still lower prices. We now quote at \$28.50 @ \$29, at makers' mill, with rumored sales of a lot of 6000 tons at \$29, delivered, or a fraction less than \$28 at mill of the seller here.

Structural Iron.—The mills are all very busy, as they usually are at this season of the year, when contractors are always clamorous, being anxious to get all the work done they can before the winter sets in. Prices are as follows: Angles, 2.30¢; Beams and Channels, 3.10¢; Tees, 2.85¢; Steel Sheared Bridge Plates, 2.65¢ @ 2.70¢; Universal Mill Plates, Iron, 2.40¢; Refined Bars, 1.90¢ @ 1.95¢.

Steel Plates.—Plate mills are still reported as working up to their full capacity, and some of them are pretty well sold ahead. Prices remain unchanged. Fire Box, 4.25¢ @ 4.75¢; Flange, 3.10¢ @ 3.20¢; Shell, 2.90¢; Tank, 2.50¢ @ 2.55¢.

Wire Goods.—There does not appear to be much inquiry, and prices continue weak. We again reduce our quotations and now quote \$40.50 to \$41 for domestic, on cars at makers' mill.

Steel Rails.—There has been little new Bessemer here of late, and in the absence of sales we quote at \$30 @ \$31 on cars at mill, according to character of order and delivery. However, both of the mills here are pretty well sold ahead, and in this respect are in better condition, probably, than some of their competitors.

Railway Track Supplies.—There is a continued good demand and prices are well sustained. Spikes, \$2.20, on cars at works, 30 days; Iron Splice Bars, \$1.95 @ \$2.05; Steel Splice Bars, \$2 @ \$2.10; Track Bolts, \$2.90 with Square and \$3 with Hexagon Nuts.

Old Material.—There has been considerable inquiry from consumers in Shenango and Mahoning Valley consumers of late for No. 1 Railroad Wrought Scrap, with sales at \$22.50 @ \$23 per net ton, delivered there, but there is not much inquiry in this market. Old Iron Axles in fair demand, with sales at \$28.50 @ \$29 per net ton; Cast Scrap, \$15.50 @ \$16, gross ton; Old Car Wheels, nominal, at \$18 @ \$18.50; Steel Bloom and Rail Ends dull and lower, \$20 @ \$20.50 gross.

Connellsville Coke.—There is still complaint in regard to the scarcity of cars. Prices unchanged. Furnace Coke, \$2.15, on cars at ovens; Foundry Coke, \$2.45; Crushed Coke, \$2.65. No recent changes in freight rates.

(By Telegraph.)

There are rumors of dickering in progress for some large blocks of Bessemer Pig, but as yet they have not been consummated. It is evident that consumers have about reached the belief that it is good to buy at present prices, and are afraid to hold off much longer lest the market might get away from them. Old Iron Rails are in better demand, with but few offerings. Offers to buy at \$28 were closed yesterday.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, October 22, 1890.

Operations in Pig Iron warrants have been on a moderate scale and the market has presented a rather flat appearance, with none but ordinary fluctuation in prices. The speculative situation is somewhat uncertain. Stringency in the money market has a restraining influence and fears of difficulties in the South have deterred buying also. These facts have been taken advantage of by operators interested in lower prices, although shipments continue large and leave makers with little Iron for sale. Scotch warrants have sold at 50/ @ 50/5; Cleveland at 47/ @ 47/7½, and Hematite at 57/1½ @ 57/4½. Business was done today at 50/2, 47/ and 57/4½ respectively.

Advices from the Continent report depression in the German market, with a reduction in the price of Sheets to 160 marks per ton.

Heavy sales of Pig Tin have been made during the week, and prices have ruled irregular, with Prompts down to as low as £97 at one time, reacting subsequently about £1, and falling again to £97. 10/. Straits shipments during the first half of the month were full, but later shipments are expected to be lighter, and that, together with smallness of spot supplies, operates to check a serious fall in prices. At the close the market was firmer, but quiet.

The disturbed condition of the stock markets has had a rather unfavorable bearing upon speculative operations in Copper,

but favorable statistics of movement and heavy consumption served to check the downward course of prices. The visible supply decreased about 1800 tons during the first half of the month and receipts since then have been moderate. Sales of furnace material are difficult to make, however, as consumers' wants are well supplied by deliveries making on previous purchases.

Purchases of Tin Plate have been brisk at improved prices. Buying for New York account is rather quiet, but further heavy purchases have been made for Frisco. The works are all busy, engaged on orders, and makers are very firm.

Scotch Pig Iron.—There is little doing in makers' Iron and first hands. In fact, practically nothing is offered, and prices are still wholly nominal:

No. 1 Coltness, f.o.b. Glasgow	Nominal.
No. 1 Summerlee, " "	.....
No. 1 Gartsherrie, " "	.....
No. 1 Langloan, " "	.....
No. 1 Cambro, " "	.....
No. 1 Shotts, " at Leith	.....
No. 1 Glengarnock, " Ardrossan	.....
No. 1 Dalmellington, " "	.....
No. 1 Eglinton, " "	.....

Steamer freights, Glasgow to New York, 2/, nominal; Liverpool to New York, 10/.

Cleveland Pig.—Lower prices for warrants have caused a reduction in makers' prices, and business is slow at the decline. About 48/ is quoted for No. 3 Middlesbrough, f.o.b.

Bessemer Pig.—A fairly good trade is still going on, but prices are irregular and again rather lower. Makers quote West Coast brands, Nos. 1, 2 and 3, at 58/, f.o.b. shipping port.

Spiegeleisen.—There has been some modification of prices, with a very fair business resulting. English 20 % quoted at 100/, f.o.b. shipping port.

Steel Rails.—The demand is moderately active and prices remain very steady. Heavy sections quoted at £5. 2/6 and light sections £5.17/6 @ £6, f.o.b. at N. W. England shipping point.

Steel Blooms.—For these there is a fair demand, and the market is rather firmer, with 2/6 advance asked. Makers' quote at £5 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—The market is firm at a slight advance, and demand runs very fair. Bessemer, 2½ x 2½ inches, £5. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Demand is moderate, but offerings are light and sellers firm. Bessemer quoted at £5. 2/6, f.o.b. at N. W. England shipping point.

Old Iron Rails.—There has been little doing in this line and prices are barely steady. Tees quoted at £3. 2/6 @ £3. 5/ and Double Heads £3. 5/ @ £3. 10/, f.o.b.

Scrap Iron.—Dealings are moderate and at former prices. Heavy Wrought quoted at £2. 6/ @ £2. 7/6, f.o.b.

Crop Ends.—Demand slow and prices rather in buyers' favor. Bessemer quoted at £3 @ £3. 2/6, f.o.b.

Copper.—There was rather more demand, and the market showed a greater firmness at the close. Merchant Bars

quoted at £58. 2/6, spot, and £58. 5/ three months futures. Best Selected, £66.

Tin Plate.—Makers very firm at the advanced prices and offer sparingly. We quote f.o.b. Liverpool:

IC Charcoal, Alloway grade	.....	18/6 @ 19/
IC Bessemer Steel, Coke finish	.....	17/9 @ 18/
IC Siemens " "	.....	18/ @ 18/3
IC Coke, B. V. grade	.....	17/6 @ 17/9
Charcoal Terne, Dean grade	.....	16/9 @ 17/

Manufactured Iron.—The general demand is moderate, and, apart from a slight shading on common Bars, prices are without change. We quote, f.o.b. Liverpool:

Staff, Marked Bars	.....	£ s. d. @ 9 0 0
" Common "	.....	7 0 0 @ 7 5 0
Staff, Bl'k Sheet, singles	.....	8 0 0 @ 8 2 6
Welsh Bars (f.o.b. Wales)	.....	6 7 6 @ 6 10 0

Tin.—A firmer tone to the market today, but operations on a smaller scale. Straits quoted at £98, spot, and £96. 10/ for three months futures.

Lead.—A fairly large business has been done, but at slightly lower prices. Quoted at £14. 2/6 @ £14. 5/ for Soft Spanish.

Spelter.—The demand is fair and prices are without change. Quoted at £24. 10/ for Ordinary Silesian.

OBITUARY.

JOHN DEAN BENTON.

John Dean Benton, who died in East Providence, October 18, was well known all over the country, his business of model building, in which he was an artist, bringing him considerable renown. He was born at Fort Independence, South Boston, Mass., in 1823, his father being in the United States service on duty. After serving in the Civil War, from which he was discharged for disability, he went to Wilmington, Del., and went to work making surgical instruments to be used in the army. While here he made a model of the Monitor, the iron vessel built by Ericsson, to be used by its owner as a watch charm. Although very small the turret would revolve and the propeller would move. One of the first good-sized working models he ever made was for the late Captain Ericsson, the inventor of the Monitor. He made for him a magnificent working model of the frigate Roanoke. The Captain was so pleased with this model that, besides paying for the work, he presented Mr. Benton with a beautiful gold watch and chain. Mr. Benton also made several models of Pullman palace cars with everything complete, for Mr. Pullman. During the Centennial Exhibition he lived at Philadelphia, and had 13 working models on exhibition, among them a model of the celebrated Corliss engine used at the exhibition. Another famous model was that of Independence Hall, Philadelphia. This model was a complete representation of the hall, inside and out, the furnishings, even the pictures on the walls, being complete. In the tower was a miniature clock, which kept excellent time. This model was thought by many to be his masterpiece, and it is now in Philadelphia. After the Centennial he removed to Providence, where he still carried on his business of model maker. Mr. Benton was the inventor of many of the best "drop-a-nickel-in-the-slot" models of machinery, and from these he reaped quite a revenue. At the time of his death he had out, among other models, two Government cruisers, a Corliss machine engine, an electric car, a farm scene, and an Armington & Sims engine. For a year or two past he has been unable to work, and last April he removed to East Providence, where he resided up to the time of his death.

HARDWARE.

Condition of Trade.

The satisfactory condition of business referred to in our last issue still continues and merchants and manufacturers alike report an excellent trade. The consumption of goods throughout the country is very large, and buyers are constantly replenishing their stocks. In several lines there is considerable difficulty in obtaining goods with sufficient promptness to meet the requirements of the trade. Manufacturers generally are well occupied with orders. Prices are not materially changed since our last review, but the market may in general be characterized as perhaps somewhat stronger, with a tendency toward higher prices in some lines of goods. The demand for imported goods has fallen off somewhat, the trade having anticipated their requirements for goods which are affected by tariff changes. There is, however, we are advised, a fair business doing in imported Hardware. The effect of the tariff also is felt in some lines of American Hardware, as manufacturers generally are availing themselves of any opportunity to advance which may be given them by the increased duties.

Chicago.

(By Telegraph.)

There is practically no change in the Hardware business from that noted in our last report. Jobbers are pushed to their utmost capacity in filling orders and making shipments of Shelf Goods, Tools, Cutlery and seasonable articles. Heavy Hardware holds its place in demand with other material. Sleigh Wood Stock and Trimings are being freely called for. No changes of any importance have occurred, but prices upon the general line of goods are held firmly at regular discounts.

Prices.

Wire Nails.—There has been a weakening in the price of Wire Nails since our last review and manufacturers are much more disposed to make concessions to induce orders. Quotations are now on the basis of \$2.30 for round lots at mill, but this figure is reported to be sometimes shaded. The amount of business is fair but not heavy, buyers being disposed to purchase only for their early requirements. The orders received indicate a very satisfactory business throughout the country, as in many instances goods are wanted immediately to replenish broken stocks.

Chicago, by Telegraph—The market today is in a less favorable condition than a week ago. Makers seem very anxious to place orders, and their anxiety has led to some shading of prices named last week. Quotations are freely made at \$2.40, f.o.b. Chicago, by manufacturers, but it would create no surprise if sales had been made at less than this price. Jobbers are quoting \$2.55 in small lots, with intimations that for carloads or even less quantities, this price could be shaded at least 5 cents

per keg. It was presumed that the meeting of the manufacturers would improve the condition of the market by settling the differences between some of the mills. The effect, however, has apparently been quite the contrary, and some of the large concerns are said to be naming low prices as a retaliation for cutting done some three or four weeks ago by mills who were thus seeking orders at the risk of demoralizing the market.

Cut Nails.—The New York market is practically unchanged since our last review, but has a somewhat improved tone. Prices for Iron Nails are held firmly, as follows: \$1.80 at mill, \$1.90 at dock, \$2 from store. Steel Nails are 10 cents per keg higher. The meeting of Eastern manufacturers will be held October 23, and it is not expected that any change in price will occur before that date. There has been some improvement in the demand, and some inquiries for large lots are in the market. The Eastern market is thus in a more satisfactory condition than the Western, as reflected in the following dispatch:

Chicago, by Telegraph.—The Cut Nail trade shows some of the demoralization in which the Wire Nail trade is. Some of the Wheeling mills are quoting \$1.70 at mill for October and November shipments. Others name \$1.75, but quotations are said to have been made from manufacturers which are below either of these figures. The market appears to be in a somewhat unsettled condition. Nails can undoubtedly be bought and laid down in Chicago at less than \$1.85 in round lots. Jobbers quote \$1.90 from store, without regard to quantity.

Barb Wire.—The demand in this market continues fair and prices are unchanged. Quotations which are as a rule well adhered to are on the basis of 3.30 cents for Four-Point Galvanized at mill, Painted Wire being 0.6 cent less.

Chicago, by Telegraph.—There is still a fair demand for Wire in small quantities. Prices are unchanged at 2.9 cents for Painted and 3.5 cents for Galvanized. It is expected that the demand will rapidly decrease, as cold weather has already interfered with fence making in some sections of the Northwest.

Wrought Goods.—The market in this line has developed some irregularities and some exceptionally low prices are being made. The competition between the different manufacturers is at present very active and it is thought that prevailing prices must be unprofitable.

Wringers.—In view of the consolidation of the interests of the leading Wringer manufacturers, as announced in another column, the market for these goods is somewhat firmer than it has been. While no further advance is announced it is thought probable that an advance will take place in case the intended consolidation is carried into effect, inasmuch as the Wring-

ers have for some time been manufactured at what are referred to by manufacturers as unprofitably low prices. As the new company will practically have control of wood frame Wringers, it is anticipated by the trade that as soon as circumstances justify it something of an advance will be made. It is, however, probable that the manufacturers will move conservatively in the matter, and thus avoid the mistake of advancing prices too much or too fast.

Anvils.—Advances have been made in the prices of the different imported Anvils in sympathy with the increased duties. The Eagle Anvils remain, however, without change, the manufacturers not being disposed to advance them until obliged to by the increased cost of production.

Cutlery.—The new lists of Rodgers' and Wostenholm's Cutlery are not yet published, it being a matter of considerable labor to prepare them, especially as the lists will receive a thorough revision, and not merely represent the increased duties on the different goods. Several of the American manufacturers of Pocket Cutlery have announced advances, but others, pursuing a more conservative policy, have refrained from doing so. Orders have of late been coming in quite freely, and many manufacturers are supplied with them for some time to come. The trade evidently anticipate advances in this line of goods in cases where they have not been announced, and the market is characterized by a decidedly firm tone.

Skates.—The present season is not an especially satisfactory one for the manufacturers, inasmuch as owing to the open winter of last year exceptionally heavy stocks were carried over. Prices are also, as a rule, exceedingly low, as instanced in the fact that the American Club Skate of fair quality can be purchased at figures that a few years ago were not thought of. In fact, the low prices at which these goods are put on the market by American manufacturers has practically driven the German goods out of the market.

Loaded Shells.—The high prices ruling for Shot have a tendency to stiffen quotations on Loaded Shells, but the fact that the Peters Cartridge Company are again in the market is supposed to operate against the announcement of an advance in prices by the associated manufacturers.

Double Pointed Tacks.—Our attention has been called to the fact that some in the trade, who do not watch the market as closely as they might, do not look with sufficient care into the way Double Pointed Tacks are put up. The original way in which these goods were offered, it will be remembered, was a gross in a paper, as they are still put up by the manufacturers. Some manufacturers are, however, putting the goods up also in packages containing 120 and 100 Tacks instead of the full count, 144, and the 120 count is perhaps the way in which they are at present most generally sold. The

which was given in our last issue, and which is manufactured by Silver & Co., 56 Warren street, New York, is \$2.50, subject to a discount of 33½ per cent. The extension is furnished for 50 cents additional, subject to the same discount.

Their Flour Bin Sifter, described on page 729, is sold at \$1.50 each, or \$18 per dozen.

The prices of their Self-Basting Roaster and Baking Pan, a description of which is given on page 729, are as follows, subject to a discount of 40 per cent.:

No. 1, 12 inches long, 8 inches wide, 7 inches high.....	\$1.00
No. 2, 14 inches long, 10 inches wide, 7½ inches high.....	1.25
No. 3, 17 inches long, 12 inches wide, 7¾ inches high.....	1.50
No. 4, 20 inches long, 12 inches wide, 8 inches high.....	1.75
No. 5, 20 inches long, 16 inches wide, 8 inches high.....	2.25

Then and Now.

THERE is no doubt that the Hardware store is changing materially in the class of its stock, and that the word Hardware is more elastic and covers a much larger range of goods than it did years ago. The old gentleman with white hair and cane, who has retired from a busy life, yet who, from force of habit and love of the business, lingers around the Hardware store of his son, decries the mixed stock of goods, and tells of the Hardware store of "ye olden time," when Anvils, and Chains, and Plows, with Nails and shelf goods largely made up the stock of Hardware. His store was a brick one, two stories high, with a 9-foot ceiling, and brick pillars between the doors and side windows. The windows were flush with the front of the store, the glass being 9 x 15 in size. The door was a single one, with a big wrought lock and brass knob, with four 9 x 15 glass in the upper part of the door to look in or out of. Nights and Sundays the whole glass front of the store was covered with wooden shutters. A Trace Chain on one side and a Rat Trap with teeth on the other side of the door gave the only signs of life, and swung alike in summer sun and winter storms. A huge box stove took in 4-foot wood and warmed the gossip circle during the winter. But profits were large, and he did not have to work very hard. The adventures of the annual trip by stage and canal boat to market for goods and to settle last year's bills for purchases were the themes of conversation for the coming months.

But what do we see in his son's store? The old gentleman sent his son away to school, much against the advice of the wisacres of the town, and after the school was ended the son took a course in a business college in a large city. A situation was afterward obtained in a large retail Hardware store. After a few years his father offered him an interest in the business at home, which he gladly accepted, and in after years took the entire burden of the business on himself. The truth of the matter was, railways had come to the sleepy home town, factories had sprung up, and things were moving too rapidly

for the father to keep up, and he knew it. His competitors, who were younger men, were getting his trade; the street on which his store and house were located was no longer the busy one of the town, and he appreciated the fact he had to have progressive help or give up business. He did not wish to give up, as his name had been connected with the Hardware trade ever since there was a town there. So a new building was erected on the best street in town, with high ceilings and plate glass show windows, and an elevator from the cellar to the third story. Tin work, plumbing, gas fitting and cornice work were all carried out. "& Son" was added to the time honored sign, and a large warehouse was built for agricultural implements, carriages and wagons.

Upon entering the store you saw the Shelf Hardware arranged in boxes nicely sampled, Tinware and Stoves on the other side of the store. In one window was a Sewing Machine and Baby Carriage, while the other show window was devoted to Tools and Builders' Hardware. Through the center of the store was a long table on which was a variety of Tinware and Housefurnishing Goods that would have done honor to a fair store, with prices plainly indicated. A large line of show goods were outside, among which were Gymnastic Supplies, Bicycles, Lawn Tennis Sets, Rubber Hose and Mixed Paints. On the second floor was a large stock of Sash and Doors. The Glass was kept in the cellar. A fine case with sliding glass doors contained Guns and Sporting Goods. One section of shelving was set apart for Electric Goods as applied to house use. A large variety of Hanging Lamps were suspended from the ceiling, and a short distance off was a well filled Bird Cage Rack. Refrigerators occupied a prominent position on platforms in summer time, which platforms in winter were used for Heating Stoves. Pumps and Windmills had a large place in the outside business. Furnaces, Steam or Hot Water Heaters were put in. Each department some one was responsible for; three or four departments being under one management, but a thorough knowledge of the goods and keeping up the stock devolved upon this person. A cash carrier system allowed the clerk to remain with the customer.

Was this modern establishment the result of two or three years' labor? No, indeed, twenty years had been spent in the growth, and in developing the wants of the place. The village has grown to a city; the simple requirements of customers have changed with the luxurious manner of living. Every inquiry for goods not in stock, whether in "his line" or not, had been noted and the demand supplied; no customer was allowed to escape. Fair and department stores had been kept pace with, the wants of the trade had been anticipated; new goods were sought for and introduced, and a progressive policy pursued during all these years. No wonder the old gentleman saw changes in the way business was done, and while he enjoys grumbling about mixed stocks, the departed glory of a strictly Hardware stock,

low prices and small profits, he glories in the large business that has grown up under the honored name of Blank & Son.

Trade Items.

THE MEETING OF THE STOCKHOLDERS of the Bailey Wringing Machine Company, Woonsocket, R. I., to which we referred in our last issue, was held October 16, to take action with reference to the sale of the company's plant to an American-English syndicate. A large majority of the stock was represented, and after careful consideration of the matter it was decided to authorize the directors to have a contract executed for the sale of the company's plant, property and good will to the syndicate. It is understood that the price to be paid for the local plant is \$475,000, the capital stock of the Bailey Company being \$250,000. The stockholders propose to sell for two-thirds cash and one-third stock in the new consolidated company, with an additional privilege of 16½ per cent. of the stock. This additional amount was subscribed for after the meeting, thus giving the stockholders of the company at least one-half of the stock of the new company. Since the stockholders' meeting the directors have met and authorized the secretary and treasurer, Geo. Reuter, Jr., to execute a contract on behalf of the company. Mr. Reuter is the present general manager of the company, and has done much toward its success. It is understood that he will occupy the position of general manager of the new consolidated company if the proposed plans are carried into effect. The plant of the company now covers 64,000 square feet, and contains seven buildings, 110 hands being employed. The daily output is 1150 machines. The other companies whose interests it is expected will be consolidated under the syndicate are the F. F. Adams Company, Erie, Pa., Metropolitan Mfg. Company, New York, and Empire Wringer Company, Auburn, N. Y. The new company will thus be given an influential position in the manufacture of Wringers, as these companies which are expected to compose it now manufacture a large proportion of the Wringers made in the country.

OUR READERS WILL OBSERVE the special notice on page 56 in which the advertiser expresses his desire to obtain a position as buyer or manager, or in other capacity of responsibility. He has had 13 years' experience as a Hardwareman, and his ability to handle systematically a large business will commend this opportunity to those of our readers who may be in need of his services.

THE AMERICAN SHEARER COMPANY, Nashua, N. H., are making a new Clipper for which Wiebusch & Hilger, 80 Chambers street, New York, are sole agents. It is termed the King, and is referred to as simple in construction and reasonable in price.

J. CURLEY & BRO., dealers in Cutlery, will remove from their present location, corner of Nassau and Beekman streets, this city, to No. 6 Warren street as soon as alterations are completed at the latter place. This change will give them more convenient accommodations, especially for their wholesale department.

B. B. NOYES & CO., Greenfield, Mass., in their advertisement on page 31 illustrate the Maud S. Curry Combs which they are manufacturing, the special features of the Comb being shown in the cuts. The point is emphasized that it is made with striper and round pointed teeth.

HAYDOCK & BISSELL, 12 Murray street and 15 Park place, New York, in their special notice on page 55 announce that

on Wednesday, October 29, by order of the St. Louis Stamping Company, a large sale of Granite Ironware will take place. This is referred to as the last sale this year of either Granite or Agate Ware and will include a complete assortment of the above well known goods. On Thursday, October 30, a large lot of Stamped Tinware, Tea, Table and Basting Spoons, Fry Pans, &c., direct from factory, will be disposed of, as well as a large assortment of Granite and Pearl Agate Tea and Coffee Pots, &c., by order of Manning, Bowman & Co. Cast Steel Hatchets, Hammers, Axes, Shovels and Spades, &c., will also be offered for sale.

W. M. CALDWELL, 75 Chambers street, New York, announces that he has purchased from the receiver of the Sanford Fork and Tool Company, Terre Haute, Ind., their entire stock of Forks, Hoes, Rakes, &c. In the circular making the announcement a memorandum of the stock at present remaining unsold is given. The statement is also made that in view of the present and probable further advance in prices the wisdom of ordering what may be required of these goods for next season's business is obvious. Orders received will be subject to previous sales.

W. B. PEARSALL, late general salesman with the Deere Plow Company, has opened an office at 216 Walnut street, St. Louis, and will represent the Butcher & Gibbs Plow Company, Canton, Ohio, and F. E. Myers & Bro., Ashland, Ohio, in Southwest Illinois, Western Kentucky and Tennessee and the States of Missouri and Arkansas. Mr. Pearsall has, we are advised, been with the Deere Plow Company for seven years and is well and favorably known in the West.

E. T. BARNUM, Detroit, Mich., is now manufacturing, besides his regular line, patent Folding and Extension Gates and Guards, which are especially adapted for entrances to banks, stores, &c., being made to fold out of sight during the day. An illustrated catalogue is devoted to this class of work.

THE EMPIRE PORTABLE FORGE COMPANY, Lansingburg, N. Y., have been giving some attention to foreign business, and we are advised that they have recently received a number of orders for export, principally from Cuba and Mexico.

IT IS PLEASANT to note the announcement issued in neat form by W. W. Woodruff & Co., Knoxville, Tenn., that they have been in business for a quarter of a century. The trade will be interested in the following extract from the folder containing the announcement:

We have now been in the Hardware business for 25 years in Knoxville. A quarter of a century is a long time to look back upon. Very few firms last so long, and during that time we have dealt with nearly 5000 merchants, of whom only about 1800 are now in existence, and on our books as regular customers. And we are happy to state that in the past year we have had the largest business we have ever transacted, necessitating the enlargement of our quarters, which we have done by adding two more stories to our double building, 176 and 178 Gay street, which are now finished and occupied, giving us 12 splendid rooms, each 150 feet long by 25 feet wide in the clear, equal to 1800 feet long, or one-third of a mile of floor room. We enter upon the twentieth-sixth year of our business fully equipped and prepared to supply the wants of our friends more satisfactorily, both as to quality and price, than ever before.

THE TRADE WILL BE INTERESTED in the announcement on page 56 in which the Union Belt Fastener Company, Unionville, Conn., illustrate their Belt Fastener. It will be observed that agents are wanted to introduce it. The point is made in regard to this Fastener that it is offered at exceptionally low figures, and that it will

outlast several common hooks, as the belt can be taken out without removing the plate.

Obituary.

JOSEPH HORNCastle, senior member of the firm of J. Horncastle & Co., Indiantown, St. John, N. B., died on the 6th inst., after a prolonged illness of three months. He was born at Upton, Yorkshire, England, November 12, 1828, and at the age of 13 took a boyish notion of going to sea. Accordingly, he set out and landed at Calio, South America. From this point he drifted northward in search of a place to permanently settle. After visiting many of the principal cities of America he finally settled in Indiantown, a suburb of the city of St. John, then a mere village, where he engaged in various occupations. One of these was surveyor of lumber, in which he was fairly successful, but owing to an accident to his knee he was obliged to discontinue this pursuit, and started a general store in 1854. The business was conducted on his own account until 1882, when he admitted to partnership his two chief clerks, Wellington L. Hamm and William J. Forless, the firm name becoming J. Horncastle & Co. At this time the business had assumed a Hardware complexion and included Builders' Material and House Furnishing Goods. After this alteration in the personnel of the firm of which he was the founder, Mr. Horncastle, having become somewhat advanced in years, discontinued his active connection with the details of his business and exercised only a general supervision of affairs, although he remained senior partner until his death. Mr. Horncastle had always enjoyed good health until attacked by hemorrhage of the bladder, which malady resulted in his death.

Consequent on the death of George J. Munschauer, a meeting of the employees of Messrs. Heinz & Munschauer and the Niagara Stamping and Tool Company was held Thursday noon, October 2, at which the following resolutions were adopted:

Resolved, That inasmuch as it hath pleased the Almighty to remove from a career of usefulness from our midst our esteemed fellow citizen and employer, George J. Munschauer, we hereby tender to his afflicted family our sincere sympathy in this hour of their bereavement. We desire to place upon record the many virtues of the deceased gentleman, his patriotic response to the call of his country, his careful and prudent business habits, his cordial disposition and unfailing courtesy, which endeared him to all with whom he came in contact. In him we lose a kind and considerate employer, an upright man of business, the city a good citizen, and his family by his loss a kind father and loving friend, whose loss can never be repaired.

Resolved, That a copy of these resolutions be sent to the bereaved family, and that we attend the funeral in a body.

Charles H. Merritt, president of the David Maydole Hammer Company, Norwich, N. Y., died on October 12, in the seventy-seventh year of his age. Mr. Merritt was born August 11, 1814, in what is now North Norwich, N. Y., and at the age of 21 opened a store in his native town. While still a young man he spent a year or two in the South as collecting agent for a mercantile firm at Darien, Ga. He subsequently returned to Norwich, where he engaged in various enterprises. In 1862 he purchased of David Maydole a quarter interest in his Hammer factory, and to the prosecution and development of this business he devoted himself with untiring energy. On the incorporation of the company in January last, Mr. Merritt was elected its first president. Mr. Merritt is referred to as a practical man of judicious and conservative methods, and was evidently highly esteemed in the community of which he was a prominent member. He

had been in impaired health for several years past, but the immediate cause of his death was pneumonia, which was of short duration. Under date October 20, the David Maydole Hammer Company announce his death and refer in graceful terms to his long and successful connection with the business.

Catalogues, &c.

THE Meriden Bronze Company, Meriden, Conn., and 30 Park place, N. Y., issue an illustrated price-list of Meriden Lamps. They also manufacture Artistic Brass Goods, Cabinet Hardware, Furniture Trimmings, Call Bells, &c. The Meriden Lamps are made with a central draft, and are shown in a variety of styles for table use, also in Piano Lamps of brass and bright silver. Another extensive line is shown in Banquet and Piano Lamps of hand forged wrought iron. Chandeliers, Hanging and Bracket Lamps are illustrated, together with Silk and Linen Shades for Banquet and Piano Lamps. The catalogue contains some 60 pages, and will doubtless be of interest to the increasing number in the trade who handle this line of goods.

The Self-Acting Bell Company, Lancaster, Pa., are about issuing a catalogue illustrating their interesting line of New Self-Acting Door Bells. The manufacturers allude to the Bell as entirely new in the application of the mechanical principles on which it is constructed, and an exact counterpart in appearance of the electric bell. It is adapted to purposes where the electric or ordinary door bell is used, and rings with the same continuous sound as the electric bell.

The Oval Churn Company, Goshen, Ind., issue an illustrated catalogue and price-list devoted to the goods manufactured by them. They state that they make a specialty of such goods as they manufacture. Their line consists of Oval Churns, Step Ladders, Excelsior Scrub Brush, Screen Doors and Cline's Bench Clothes Wringers, all of which are illustrated, accompanied by a detailed description of each.

The Neverslip Horseshoe Company, 36 India Wharf, Boston, Mass., and Chicago, Ill., issue a catalogue and circulars relating to the Neverslip Horseshoe, in which are used Steel Centered and Self-Sharpening Removable Calks. The introduction of their Shoes and Calks is through agencies, to whom is given the sole control of the goods in the territories canvassed by their salesmen, and in which they have their established trade direct with the Blacksmiths and Horseshoers. The manufacturers state that they are constantly at work experimenting in efforts to perfect their Calks, and expect this winter to send out the best and most durable ones they have ever made.

J. Pope & Son, Manchester, Maine, issue an illustrated price list of Granite Wedges and Half Rounds. They state that they are making a specialty of Wedges, and have lately made improvements in the manufacture of them, especially in their methods of tempering. They advise us that because of the increase of their business, they have been obliged to add to their works, and their sales for the past year have been larger than ever before; that they intend to keep a stock of Wedges on hand and to be able to fill orders without delay.

The Richards & Conover Hardware Company, Kansas City, Mo., importers and wholesale dealers in Hardware, send us a price current of fall goods. It is largely illustrated, showing Axes, Saws, Scoops, Lumber and Mining Tools, Carpenters' Tools, Curry Combs, Tackle Blocks, Ice Tools, Coal Hods, Stove:

Boards, Lanterns, Tinware, Clocks, &c. In an introductory notice to the trade, they state that the catalogue represents but a small portion of their stock; also that they are provided with complete railroad switch facilities, enabling them to give carload orders prompt and immediate attention.

C. H. Amidon, Buffalo, N. Y., issues illustrated sheets showing Braces, the Amidon Safety Sash Lock and the Amidon Perfect Adjustable Shaft Wringer. The Sash Lock is described as locking both sashes at any point, so preventing rattling, and as being made of malleable iron. The upper roller of the Wringer has knuckle joints between the roller and the cogs, which gives partial adjustment. The cogs are outside of the tub, which is referred to as preventing grease dropping on the clothes. Another advantage claimed is that it is always in mesh, that it cannot be thrown out of gear by wringing a large article.

Jos. H. Seed, 21 and 23 Centre street, New York, issues circulars illustrating Seed's Reversible and Self-Cleansing Improved Water Filter. These are made to fit $\frac{3}{4}$, $\frac{1}{2}$, $\frac{3}{8}$, $\frac{1}{4}$ and $\frac{1}{8}$ Screw or Plain Faucets. This Filter is manufactured of brass, nickel plated, with two perforated strainers inside, and filled with filtering material.

George Brown, Knoxville, Tenn., jobber of Guns and Sporting Goods, issues a net wholesale price-list illustrating these goods. Both breech and muzzle Guns are shown; also Rifles, Leggins, &c. Prices are given on Loaded Shells, American Rifle Powder, Tennis Sets, Base Ball Goods and Bicycles.

The Ludlow-Saylor Wire Company, 116 South Fourth street, St. Louis, Mo., issue a circular giving illustrations of Fenders, Flower Stands, Ash Sifters, Wire Mats, Dress Forms, Pinless Clothes Lines and Metal Grills. They made a specialty of Metal Work for House Decorations, finished in brass, oxidized silver, copper and Bower Barff.

The Goulds Mfg. Company, Seneca Falls, N. Y., and 60 Barclay street, New York, issue a special circular and price-list of new Irrigating Pumps, Horse-Powers and Appliances for every range of service. Illustrations are given of Goulds' Direct and Geared Triplex Suction and Force Pumps, Goulds' Iron Horse-Powers, Goulds' Combined Horse-Power and Triplex Irrigating and Cattle Pump, besides many other styles of Pumps and Hydraulic Rams. This instructive and comprehensive digest on artificial irrigation will doubtless be appreciated by those for whom it is intended.

W. E. Lewis, Corry, Pa., manufacturer of Telegraph Instruments, Electric Bells, &c., issues an illustrated price-list of these goods. The illustrations show Pony Relays, Box Relays, Standard Sensitive Telegraph Sounder, Morse Keys, Oblong Bronze Push Button, Magneto Call Bells, Gravity Batteries and Le Clanche Battery. In regard to the class of goods manufactured by him, he claims to make nothing but first-class goods, for practical business; and states that he has been manufacturing about four years and that sales have increased rapidly, his goods giving satisfaction.

The Perkins Lock Mfg. Company, Cleveland, Ohio, send us illustrated circulars of various lines of Locks and Knobs manufactured by them. Especial attention is directed to their front door Lock with night attachments, all operated by one key and one keyhole. The advantages of this Lock are referred to as being that the door can be kept securely locked at all times on night bolt, and at the same time be accessible from the outside with one key. The operation is per-

formed by first turning the key once around, throwing the night bolt back, then turning the Key half way round and throw latch back and the door is open.

The Chicago Spring Butt Company, Chicago, and 97 Chambers street, New York, issue a catalogue and price-list under date October, 1890. This relates to Patent Spring Hinges, Scranton Door Hangers and Hardware Specialties. They state that they will continue the manufacture of Scranton Patent Hangers, formerly manufactured by Scranton Mfg. Company.

The Bronson Supply Company, Cleveland, Ohio, are distributing a very neat catalogue and price-list of the Never Break Wrought Steel Cooking Utensils, which they manufacture in great variety. The pamphlet shows Spiders, Kettles, Stew Pans, Maslin Kettles, Cake Griddles and a line of Ware specially adapted for hotels, restaurants, steamboats and dining cars. The publication consists of 20 pages, and is bound in colored paper covers of a durable character.

The E. C. Meacham Arms Company, St. Louis, Mo., issue their price current for dealers only under date of October 2. This is devoted to prices and illustrations of Guns, Rifles, Traps, Cartridges, Revolvers, Gun Tools, Bicycles, &c.

The Derby Silver Company, Birmingham, Conn., and 25 Maiden lane, New York, San Francisco and Chicago, issue a catalogue of over 100 pages, illustrating the large line of goods manufactured by them. Beside Tea Sets, Waiters, Water Pitchers and goods of this class, they manufacture Manicure Sets, Hair Brushes, Mirrors, Odor Bottles, &c. The variety of styles and the number of illustrations make the catalogue a desirable one for reference.

The L. M. Rumsey Mfg. Company, St. Louis, Mo., issue an illustrated catalogue for 1890, No. 60, for distribution to the trade. It is devoted to Agricultural Machinery, and relates to Road Scrapers, Barrows, Trucks, Cotton Machinery, Feed Mills, Corn Shellers, Evaporators, Woven Wire Fencing, Corrugated Iron, Circular Saws, Belting, Pulleys, Well Machinery and Tools, Pumps, Fire Department Supplies, &c.

Exports.

PER BARK ESSEX, SEPTEMBER 19, 1890, FOR DUNEDIN, NEW ZEALAND.

By R. W. Cameron & Co.—12 dozen Hammers, 113 pounds Sash Cord, 6 dozen Meat Choppers, 40,000 Hardware, 6 dozen Tinware, 50,000 Metallic Cartridges.

By W. H. Crossman & Bro.—2 cases Hardware, 1 dozen Pumps, 3 dozen Parers, 5 dozen Vises, 5 packages Hardware, 4 dozen Lamps, 1 cask Lamp Goods.

By Dunbar, Hobart & Co.—10,640 pounds Nails, 62 pounds Shoe Tools, 300 pounds Eyelets.

By Reed & Barton.—3 casks Silver Plated Ware.

By H. W. Peabody & Co.—3 cases Lampware, 8 cases Tools, 1 case Nails, 2 barrels Frying Pans, 350 gross Crayons, 1 case Hardware, 4 crates Churns, 13 packages Hardware, 2240 pounds Nails, 13 packages Hardware, 9 dozen Lampware, 400 pounds Nails, 13 packages Stoves, 1 barrel Lampware, 1 case Silverware, 4 bundles Hardware, 9 Stoves, 1 dozen Wringers, 10 packages Hardware, 6 dozen Rat Traps, 300 pounds Nails, 5 cases Hardware, 1 case Mangles, 1 dozen Wringers, 500 pounds Nails, 11 cases Hardware, 8 Wringers, 10 dozen Shovels, 6 dozen Mouse Traps, 4 packages Lampware, 1600 pounds Nails, 2 cases Churns, 3 packages Hardware, 3 boxes Scales, 6 dozen Sifters, 1 dozen Wringers, 17 Churns, 1 case Tools, 1 barrel Blocks, 1 cask Pumps, 6 Stoves, 4 packages Hardware, 5 cases Lampware, 1 case Oilers, 14 Stoves, 22,440 pounds Barb Wire, 12 cases Tools, 2 cases Lampware, $\frac{1}{2}$ gross Stamped Ware, 5 dozen Wringer Handles, 10 packages Churns, 10 packages Hardware, 3 cases Agate Ware, 1 cask Pumps, 1 case Lampware, 1 case Churns, 3 cases Plow Parts, 2 cases Tools, 1 case Mouse Traps, 1 case Saws, 2 cases Tools.

FOR AUCKLAND.

By H. W. Peabody & Co.—1 case Lampware, By R. H. Dana & Co.—4 cases Wringers.

By Arkell & Douglas.—8 cases Axles, By R. W. Forbes & Son.—1 dozen Wranches, 101 boxes Horse Nails, 11 boxes Plows, 112 dozen Tools, 1060 pounds Oil Stone, $8\frac{1}{2}$ dozen Churns and Wringers, 10 crates Stoves, 1434 pounds Bolts, 35 packages Hardware.

By H. W. Peabody & Co.—16 sets Axles, 88 packages Hardware, 24 packages Lampware, 5 dozen Wringers, 30 dozen Wireware, 30 Shellers, 7 cases Hardware, 6 packages Lampware, 9 sets Axles, 6 Shellers, 1 case Tinware, 20 dozen Thermometers, 2 dozen Scales, 12 packages Grindstone Fixtures, 2 Ranges, 3 packages Lampware.

By W. H. Crossman & Bro.—15 Lawn Mowers, 3 cases Snaths, 2 cases Agricultural Implements, 56 dozen Hardware, 15 packages Lamp Goods, 10 gross Pistols, 2 gross Razor Strops.

By Arkell & Douglas.—16 Churns, 2 Stoves.

PER BARK NAPIER, SEPTEMBER 19, 1890, FOR ADELAIDE, AUSTRALIA.

By Mailler & Quereau.—3 cases Agricultural Implements, By Strong & Troubridge.—4 dozen Cork Pullers.

By Rogers, Smith & Co.—678 pounds Plated-ware.

By Coombs, Crosby & Eddy.—1 case Shells, 2 cases Carabines, 1 case Cartridges.

By Strong & Troubridge.—15 boxes Parers.

By John Gifford.—3 cases Saws.

By W. H. Peabody & Co.— $3\frac{1}{2}$ dozen Sad Irons, $6\frac{1}{2}$ gross Pencils, 3 cases Agate Ware, 1 case Hardware, 11 dozen Scoops, 60 packages Hardware, 9 Pumps, 5 cases Miter Boxes, 10 crates Stones, 50 cases Skewers, 1 package Screws, 57 dozen Mouse Traps, 4 dozen Strops, 4 cases Hardware, 3 barrels Lamp Ware, 1 dozen Mangles, 3 packages Hardware, 22,400 pounds Barb Wire, 1 case Tools, 2 Stoves, 10 cases Hardware, 4 cases Wranches, 14 cases Hardware.

By R. W. Forbes & Son.—90 pounds Stone, 8 packages Hardware, 3 packages Hardware.

By W. H. Crossman & Bro.—2000 pounds Nails, 9 dozen Oil Stoves.

By H. W. Peabody & Co.—7 cases Hardware, 16 crates Stoves, 3 cases Tools, 400 pounds Nails, 1 case Agate Ware, 17 cases Hardware, 1 case Screen Wire, 18 Wringers, 36 crates Stoves, 3 cases Finishing Nails, 1 case Rivets.

By McLean Bros. & Rigg.—8000 Bolts, 6 sets Sad Irons, 2 gross Harness Snaps, 8 dozen Hoes, 6 dozen Mouse Traps, 9 Planes, 2 dozen Cork Pullers, 2 dozen Coffee Mills, 1 case Lampware, 40 dozen Pulleys, &c., 4 dozen Locks, 2 dozen Hoes, 5 reams Sandpaper 40 dozen Axes, $1\frac{1}{2}$ dozen Pumps, 1 dozen Windmills.

PER SHIP PROF. JOHNSON, SEPTEMBER 25, 1890, FOR SYDNEY, AUSTRALIA.

By Chas. B. Seabury.—3 barrels Curry Combs.

By W. & E. Douglas.—48 Pumps.

By Edward Miller & Co.—11 packages Lamp Goods.

By Coombs, Crosby & Eddy.—9 dozen Lampware, 6 dozen Bench Screws.

By Edward Miller & Co.—31 packages Lamp Goods.

By A. S. Lacelles & Co.—4 cases Plated Ware.

By W. K. Freeman.—322 pounds Shelf Hardware, 2255 pounds Axles.

By W. H. Crossman & Bro.—4 boxes Hardware.

By R. W. Forbes & Son.—1 case Hardware,

4 packages Carriage Hardware, 1 case Carriage Bolts, 6 packages Carriage Hardware.

By Welsh & Lea.—22 cases Iron Bolts.

By Collins & Co.—40 dozen Tools.

By V. Basanta.—3 dozen Step Ladders, 6 dozen Beaters, 35 dozen Axes, 7 dozen Oil Cans, 24 dozen Oilers, $3\frac{1}{2}$ gross Wire Goods,

1 package Strops, 22 Lamp Goods, 2 gross Locks, 16 dozen Hinges, 6 dozen Cow Bells,

2 dozen Money Drawers, 25 packages Lamp Goods.

By Arkell & Douglas.—2 cases Carriage Hardware, 2 dozen Wringers, 17,095 pounds Plows, 12 dozen Axe Handles, 18 pounds Hardware, 8 dozen Lanterns, 1 case Pumps,

1 case Wranches, 12 dozen Rakes, 60 dozen Whipstocks, 3 dozen Churns, 1 dozen Scoops,

6 dozen Saws, 9 dozen Hammers, 3 dozen Sad Irons, 15 dozen Axes, 100,000 Primers,

5 dozen Axes, 9 dozen Bench Screws, 2 gross Lamp Goods, 6 dozen Transom Lifters,

6 dozen Scythes, 4 dozen Wheelbarrows, 3 dozen Locks, 788 dozen Lamp Goods, 20 dozen Axes, 2 dozen Money Drawers, 30 dozen Halters, 4 dozen Brushes, 8 dozen Braces, 4 dozen Axle Clips, 1800 pounds Bolts, 228 pounds Sandpaper, 18 dozen Lanterns, 6 dozen Bush Hooks, 2 dozen Braces.

PER BARK BENGUELA, SEPTEMBER 27, 1890,
FOR PORT ELIZABETH, SOUTH AFRICA.

By R. W. Forbes & Son.—2 1-6 dozen
Wrenches.

By Coombs, Crosby & Eddy.—230 dozen Edge
Tools, 18½ dozen Carpenters' Tools, 50,000
pounds Barb Wire, 350 pieces Agricultural
Implements, 31 cases Sash Weights and
Cord, 6214 pounds Nails, 32 Store Trucks, 20
Corn Shellers, 39 Scales, 117 dozen Hard-
ware, 1½ dozen Agricultural Forks.

FOR CAPE TOWN.

By Coombs, Crosby & Eddy.—4 dozen Corn
Shellers, 8 dozen Edge Tools, 1 dozen Hay
Forks, 1 case Carpenters' Tools, 3 Ladders,
350 feet Hose, 2047 pounds Barb Wire.

PER SHIP ORION, OCTOBER 1, 1890, FOR
MELBOURNE, AUSTRALIA.

By H. W. Peabody & Co.—147 packages Hard-
ware, 23 cases Lampware, 1 dozen Cork
Pullers, 32 packages Stoves, 3000 pounds
Nails, 3 dozen Wringers, 1 case Stamped
Ware, 7 dozen Stencils, 24 dozen Mouse
Traps, 42 dozen Wringers, 500 pounds Black-
ing, 1 case Stamped Ware, 53,000 Cartridges,
3 cases Primers.

By Arkell & Douglas.—1670 pounds Axes,
1 dozen Wringers, 1320 pounds Hames, 2381
pounds Axes and Hatchets.

By Edw. Miller & Co.—7 boxes Lamp Goods.
By Welsh & Lea.—3 cases Hardware.

By Sargent & Co.—56 packages Hardware, 1
barrel Cow Bells.

By Strong & Trowbridge.—60,000 Cartridges,
150,000 Skewers.

By Goulds Mfg. Co.—52 Pumps, 2835 pounds
Pumps.

By Inghar, Hobart & Co.—60 cases Nails.

By R. H. Dana & Co.—100 dozen Axes.

By W. H. Crossman & Bro.—4 dozen Meat
Choppers, 3 dozen Razor Strops, 2 cases
Hardware, 3 gross Traps, 24 dozen Ham-
mers, 5 dozen Wringers, 10,000 Primers, 2
dozen Grindstone Fixtures, 24 cases Lamp
Goods, 25 Scales, 36 cases Hardware, 10 tons
Barb Wire, 50 Oil Stoves, 4 cases Hardware.

By McLean Bros. & Rigg.—36 dozen Gate
Latches, 1 dozen Rifles, 9 dozen Hoes, 50
sets Axes, 15,000 Cartridges, 3 cases Lamp
Ware, 57 dozen Drills, 3 dozen Hay Forks,
19,000 Bolts, 56 pounds Oil Stone, 12 Corn
Shellers, 17 packages Lamp Goods, 6 dozen
Axes.

By Arkell & Douglas.—2 Windmills, 2 Pumps,
24 dozen Axes, 2240 pounds Nails, 9 dozen
Locks, 6 Lawn Mowers, 32 kegs Nails, 1600
Bolts, 2 Scales, 1 dozen Wrenches, 1 dozen
Wringers, 42 kegs Nails, 4 dozen Hammers,
1 dozen Meat Choppers, 3 dozen Traps, 1
dozen Balances, 3 dozen Oilers, 112 pounds
Oil Stone, 1 dozen Saw Sets, 18 dozen Axes,
4 dozen Hoes, 15 dozen Traps, 3 dozen Beat-
ers, 5 dozen Choppers, 2 dozen Hoe Handles,
3½ dozen Wringers, 3 dozen Churns, 2 dozen
Carpet Sweepers, 18 dozen Whip Stocks, 720
dozen Axe Handles, 50 kegs Nails, 19 dozen
Axes, 40 dozen Hinges, 12 dozen Door
Springs, 15 cases Nails, 2 dozen Churns,
36 dozen Cages, 2 dozen Hammers,
20 dozen Axes, 9 dozen Braces, 33 dozen
Axes, 30 kegs Nails, 2 dozen Traps, 210 dozen
Rivets, 12 sets Axes, 3 sets Axes, 36 dozen
Rakes, 9 dozen Braces, 2 dozen Daubers, 10
kegs Nails, 3 dozen Sifters, 20 dozen Axes, 2
dozen Wringers, 45 dozen Axes, 12 Stoves,
39 sets Axes, 50 dozen Locks, 10 dozen
Spades, 9 dozen Planes, 3 dozen Oil Cans,
3600 pounds Bolts, 8 dozen Wrenches, 116
dozen Stamped Ware, 10 dozen Axes, 400
pounds Nails, 39 kegs Nails, 3 dozen Bench
Screws, 6 dozen Axes, 7 dozen Mowers, 38
dozen Axes, 36 dozen Traps, 3 dozen Chop-
pers, 16 dozen Lampware.

FOR BRISBANE.

By Reed & Barton.—48 pounds Plated Ware.
By Tower & Lyon.—2 cases Locks, 7 cases
Hardware.

By V. Basanta.—3 dozen Saws, 4 dozen
Braces, 30 Stoves, 2 dozen sets Sad Irons, 3
dozen Choppers, 4 dozen Stencils, 1½ dozen
sets Sad Irons, 12 Stoves, 2 dozen Locks, 22
dozen Grindstone Fixtures, 15 dozen Bells,
12 dozen Locks, 9 dozen Bells, 6 dozen Traps,
224 pounds Oil Stone, 3 Scales, 9 packages
Lamp Goods.

By H. W. Peabody & Co.—2 cases Lanterns,
100 pounds Nails, 1 ream Sandpaper, 500
pounds Nails, 1 case Carriage Hardware.

By Arkell & Douglas.—5270 pounds Axes, 17
dozen Saws, 4 dozen Hatchets, ½ dozen Bar-
rows, 16 dozen Locks, 2 dozen Traps, 15
dozen Axes, 224 pounds Oil Stone, 33 Stoves,
19 dozen Saws, 6 dozen Snaths, 1 Corn
Sheller, 9 dozen Lampware, 4 dozen
Wrenches, 2 dozen Lead Pencils, 9 dozen
Wrenches, 4 dozen Drills, 2½ dozen Meat
Choppers, 3 dozen Churns, 20 dozen Saws,
6 Stoves, 4 dozen Hammers, 3 dozen Bench
Screws, 2 Scales, 8 dozen Wrenches, 2 Scales,
60 dozen Axes, 112,000 pounds Barb Wire.

REVIEW OF THE WHOLESALE MARKET IN PAINTS AND OILS.

*It should be understood that the prices
quoted in this column are strictly those cur-
rent in the wholesale market, and that
higher prices are paid for retail lots. The
quality of goods frequently necessitates a con-
siderable range of prices.*

Paints and Colors.

Business in the general line of Paints
and Colors is proceeding in about the
usual manner, with buyers' operations con-
ducted, for the most part, on lines indicating
that a conservative policy is still in favor
among both jobbers and retailers. How-
ever, it would appear from general report
that distributions have been rather freer
than during the preceeding week, fairly
good returns having been received from
traveling salesmen who started out a short
time ago, while the local trade demand has
been of average volume. Revised price-
lists for various lines of specialties have
been issued by several firms, in which
the effect of enhanced cost of crude ma-
terials is reflected, but no changes on the
more staple lines have taken place.

White Lead.—Prices for various brands
of "cheap Leads" have been revised in
accordance with the present high level of
cost and the current rates for the pure
carbonate, but no further change in value
of the latter has taken place. Pig Lead
is somewhat cheaper, but still relatively
as high as the pigment, and it is thought
improbable that corrodors will reduce their
prices unless the value of the crude mate-
rial drops below 5¢ @ 7 lb. Jobbers, it is
claimed, are carrying only moderate stocks
of the corrodors' product and cutting of
list prices is, therefore, not carried to the
extreme that it was some time ago. Cor-
rodors still emphatically deny that their
agents or salesmen have deviated from the
official list to the slightest extent. The
movement of pure Lead has been very
fair the past week, and manufacturers of
the cheaper article claim that their sales
are in excess of the October average.

Red Lead and Litharge.—Prices are
firm at the recent advance and the volume
of business fair, but individual purchases
run chiefly on moderate sized lots.

Zincs.—The market for American brands
remains in strong position, there being a
very steady demand, while the supply of
crude material is moderate and the cost of
the same still high. Foreign brands are
very firmly held at former prices and
meeting with fair sale.

Colors.—Owing to scarcity and high
cost of Prussiate Potash, manufacturers of
Blue Colors are asking 5% @ 10% advance
on late prices, and offer with more than
ordinary reserve. On the general line of
Reds prices are quite firm and in other
lines there is a generally steady feeling.
The distribution all through is on a fairly
liberal scale.

Oils and Turpentine.

There has been but slight variation in
prices of Animal and Vegetable Oils the
past week, but a more general firmness is
visible and the situation nearly all along
the line looks favorable. Export buyers
are operating cautiously, and home trade
buying seems to be governed in a good
measure by imperative wants. Still, sup-
plies in first hands are kept well under
control, with the effect of holding values
quite firm.

Linseed Oil.—Out-of-town-brands have
been offered more freely at 59¢, delivered
in New York, but no important quantities
are taken by the local trade. City product
meanwhile moves off steadily at full pre-
vious prices, and there are no signs of any
weakness on the part of crushers.

Cotton Seed Oils.—In this line of prod-
ucts there has been merely a fair busi-
ness, and the general situation is much
the same as it was a week ago. Prime
quality Crude brings 27¢, and prime
Summer Yellow 33¢ @ 34¢, while "off"
grades sell at 1¢ @ 3¢ less. Very fair
sales are said to be making of crude for
shipment direct from the mills.

Fish Oils.—Several hundred barrels of
crude Menhaden Oil have been sold at 20¢
@ 21¢, showing a steady market, and the
manufactured products have had fair
movement at old prices. Sperm Oils are
very firm, owing to high prices asked for
Crude in the Eastern market.

Miscellaneous.—No changes have taken
place in prices of Olive, Cocoonut, Palm
or Red Oils, all of which appear to be
firmly held, although in limited demand.

CONTENTS.

Bolt Lathc. Illustrated.....	691
Pike's Peak Cog Railroad.....	691
Notes on the Cubic Compression and the Cold Flow and Crushing Strength of Iron, Steel and Other Metals	692
Southern Miscellany.....	694
Reciprocity with Canada	695
New England's Growth.....	695
A Suspended Feed Table for Rolling Mills. Illustrated.....	695
Our Visitors in the West.....	696
Virginia Iron Notes.....	700
Southern Tin Making	700
The Flow of Metals and Its Relation to Test- ing. Illustrated.....	700
Personals.....	701
Monarch Magnetic Separator. Illustrated..	702
Twin Screw Armored Ram	703
Notes on Recent Improvements in German Steel Works and Rolling Mills. Illustrated	704
The Week.....	710
Manufacturing: Iron and Steel, Machinery, Hardware, Miscellaneous.....	711, 712
More Naval Vessels.....	712
Editorials:	
An Engineers' Congress in 1890.....	713
The Condition of Trade.....	713
Merchant Cruisers in Maritime Warfare	713
Competition Compatible with Brother- hood.....	714
Washington News.....	714
The Ironmasters' Excursion.....	715
Trade Report: Chicago, Philadelphia, Cleve- land, Cincinnati, Louisville, Chattanooga, St. Louis, Detroit, New York, Financial, Metal Market, New York Metal Exchange, Coal Market, Pittsburgh, British Iron and Metal Markets.....	716-721
Obituary.....	721
Hardware: The Condition of Trade, Prices, Obituary, Catalogues, &c., Exports	722-727
Review of the Wholesale Market in Paints and Oils: Paints and Colors, Oils and Tur- pentine.....	727
Indurated Fiber Fire Cask and Pall. Illus..	728
The New American Ratchet Brace. Illus...	728
The Acme Filter. Illustrated	728
The Cheney Mandrel. Illustrated.....	728
The J. G. C. Covered Spring Hinge. Illus..	729
Pinless Clothes Line. Illustrated	729
The Royal Self Rasting Roaster and Baking Pan. Illustrated.....	729
Combination Flour Bin and Sifter. Illu7...	729
Solid Machinist Vise. Illustrated	730
Expanded Metal Guards. Illustrated.....	730
Indurated Fiber Dip Basket. Illustrated..	730
Cotton Seed Fork. Illustrated	730
The Fifteen Finger Grain Cradle. Illustrated	731
The World's Fair Hanger. Illustrated.....	731
Drendul's Sand Screens. Illustrated.....	731
Current Hardware Prices.	732-737
Paints, Oils and Colors.....	737
Current Metal Prices	738

Indurated Fiber Fire Cask and Pail.

The United Indurated Fiber Company, for whom Cordley & Hayes, 173 and 175 Duane street, New York, are agents, are putting upon the market fire casks, as illustrated herewith. The pail has a round bottom which reduces the likelihood of



Indurated Fire Cask and Pail.

its being used for other purposes, there being a hole of corresponding size in the cover of the cask for the pail to rest in. There is but one size of the cask carried in stock, this holding 28 gallons. These casks are especially recommended for hotels, stores, offices and other public buildings.

The New American Ratchet Brace.

The American Bit Brace Company, Buffalo, N. Y., are introducing the new American Ratchet Bit Brace, parts of which are illustrated herewith. Fig. 1 shows both pawls in an upright position,



Fig. 1.—Pawls in an Upright Position.

so as to hold the socket from revolving in either direction. Fig. 2 represents one pawl pressed down by a partial turn of the knurled ring, to allow the ratchet to work on that side. Fig. 3 shows the indentations in the socket into which the pawls fit. The following claims are made

for this ratchet bit brace by the manufacturers: That all strain is from the outside to the center, securing great strength, positive, quick action; that the adjustment is simple, compact and fitted with



Fig. 2.—One Pawl Pressed Down.

great care; that no part can get out of place or out of order; that the ratchet has a small amount of back and forth motion, on account of the increased number of



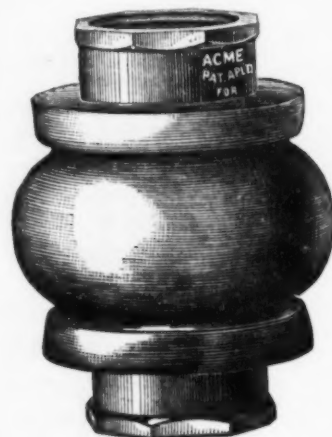
Fig. 3.—Socket with Indentations.

teeth in the socket, and that they are made from the best material, well proportioned and carefully adjusted. These are finished in heavy nickel plate or with a fine polish.

The Acme Filter.

The Ellis, Merton Company, Marlboro, Mass., are introducing the Acme Filter, as illustrated herewith. The interior of the filter is described as containing a combination of metal fans, so arranged as to force the water through all parts of the filter, bringing every particle of filter packing into active service. The packing is composed of fine rock crystals intended not to absorb sediment, but to remain pure and unworn after constant and prolonged use. Between each cap and body of the filter is a set of double woven, heavy nicked gauze. It is stated that when the faucet, gate or valve is shut, the compressed packing holds water in suspension from the bottom of the filter to the valve, which causes the gauze to be constantly

immersed; the point is made that owing to this arrangement the gauze will not corrode, nor is it broken by sudden and repeated shocks of the water current when the valve is opened. The claim is made by the manufacturers that the compressed packing is a perfect medium of filtration, as the crystals are evenly distributed and firmly held so that the myriads of fine water channels are kept open for the passage of the conduct water, and yet the particles are so closely joined that even



The Acme Filter.

the finest sediment is caught by this filter. The filter is to be attached to the faucet and should be reversed once every day. The water coming in at the reverse end is to clean out the collected sediment.

The Cheney Mandrel.

The Illinois Iron and Bolt Company, Carpentersville, Ill., are introducing Cheney's blacksmiths' cones or mandrels, as illustrated herewith. The peculiar feature of these mandrels is the slot, which is



The Cheney Mandrel.

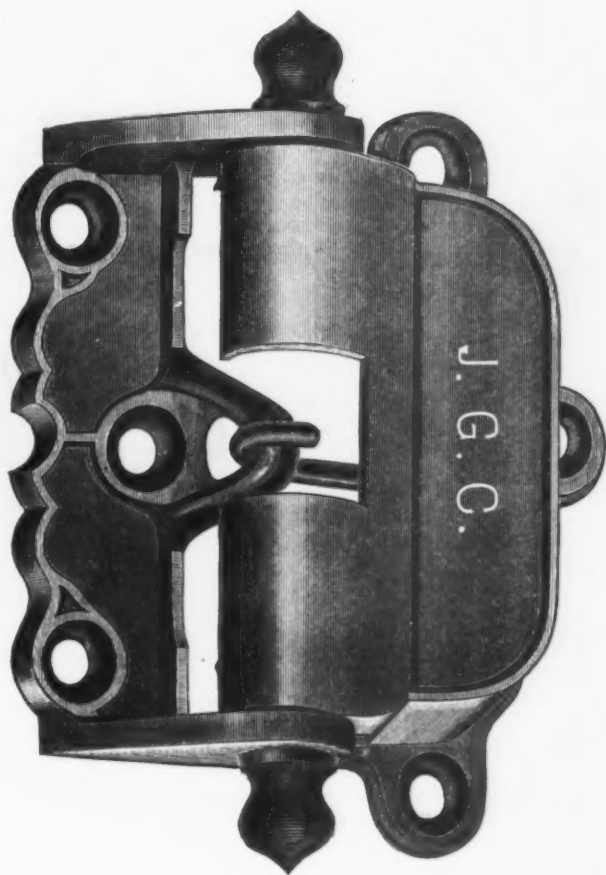
referred to as being convenient for holding the end of iron in bending rings or for handling rings with tongs. The mandrels are strengthened with ties inside the slot.

It is reported from London that many skilled workmen are planning to come to America, expecting to find employment under the new tariff.

The J. G. C. Covered Spring Hinge.

The Coleman Hardware Company, Chicago, Ill., are putting on the market a new covered Spring Hinge, as illustrated herewith. The hook shown in the illustration is C-shaped. There are two heavy pins cast with the covered part marked J. G.

C. down makes an opening in which the articles are placed. Upon being released the wires close on the articles, holding them for drying. The following points are made by the manufacturers: That this line is easy to attach clothing to, and to remove them without tearing; that the finest fabrics can be easily removed, even



The J. G. C. Covered Spring Hinge.

The points of contact being on the under side, one on each side of the letters indicated. Around these pins are coiled spring wire, forming two springs, the longer ends crossing each other opposite the C hook. The covered end of this hook is hung on the springs at the point of intersection. As the spring is opened the hook slips along on the spring wires, creating the tension which closes the door when released. Among the points of excellency claimed for the hinge is the strong tension that is secured by using the full strength of both springs at the closing point, and the covered spring with the consequent absence of rust and binding, enabling the spring to work smoothly. For the regular trade these are finished in black japan and coppered bronze, but on special orders they will be finished in electro-nickel, bronze, brass, copper, Japanese or steel blue.

Pinless Clothes Line.

The Ludlow Saylor Wire Company, St. Louis, Mo., are introducing a wire clothes line, as illustrated herewith. The sections are each 15 inches long, the line being used without pins, and are made in lengths

when frozen; that the clothes cannot blow off; that the harder the wind blows the more firmly the clothes are held to the line, and that it need not be taken in doors, as it will not rust. These lines are also referred to as desirable for merchants to use in displaying their goods.

The Royal Self Basting Roaster and Baking Pan.

Silver & Co., 56 Warren street, are putting upon the market a Self Basting



Fig. 1.—Royal Roaster and Baker.

Roaster and Baking Pan, as illustrated in Figs. 1 and 2. Attention is directed to the construction of the cover, which has

poured into the pan while in use. An open wire frame, on which the meat rests, is furnished with each roaster and baker. The object of this construction, aside from keeping the meat from burning, is to



Fig. 2.—Showing Interior of the Roaster and Baker.

allow an even temperature of heat and steam to entirely surround whatever is in the pan. It is stated that this form of frame is more desirable than those made of cast iron or sheet metal. Prices will be found in our Trade Report of this issue.

Combination Flour Bin and Sifter.

Silver & Co., 56 Warren street, are introducing a combined flour bin and sifter, as illustrated herewith. The point is made that the construction of the bin is



Combination Flour Bin and Sifter.

such that the weight of the flour is on the sides of the bin, keeping it off the sifter, and that when the crank of the sifter is turned the flour is fed to the sifter regularly and evenly. The square pattern of the bin is alluded to as being the only shape that is sufficiently strong to answer the purpose for which the sieve is intended. The bin is supplied with a ventilator of wire gauze to allow moisture to escape and prevent flour from hardening and forming into lumps. Prices of this bin and sifter will be found in the Trade Report of this issue.

A linen mill is to be erected in Minneapolis by a new company with \$500,000 capital, and J. C. Allen, of Belfast, will be the managing director. Another large mill is proposed by the Eau Claire Linen Company and several large scutching mills, to prepare the raw material, have been started on the American side of the Canadian border line. Other similar projects are spoken of.

The Pinless Clothes Line.

of 15, 20, 30, 40, 50 and 60 feet. It will be seen from the cut that each section is made of double wires, fastened together near the loops with metal bands. The upper wire is bent, which being pressed

rib pieces that lock the corners in position, and give a neat finish. A nickel plated valve is placed in the cover, to slide, the use of which is to let steam escape when desired, and permits of water being

Solid Machinist Vise.

The Bonney Vise and Tool Works, Philadelphia, Pa., are putting on the market a line of solid machinist vises, as illustrated herewith. These include jewelers' and tool makers' vises and are made with jaws from 3 to 6 inches in width. They have two heavy independent square steel bars, with a heavy square thread steel screw passing through the center. This construction is designed to bring the resistance in the center of, and to divide the strain, and to prevent the jaws from

on a direct pull, and not crush the top of the tooth. The manufacturers state that these vises are especially adapted for railroad, marine and large machine shops, where a solid, strong and durable vise is required.

Expanded Metal Guards.

The Central Expanded Metal Company, 116 Water street, Pittsburgh, Pa., are introducing a metal tree guard, as illustrated herewith. It is made of one sheet, of $1\frac{1}{4}$ inch mesh expanded metal, bent in

at the upper ends are driven on the outside of the guard to a depth of about 2 feet, and remain the same length above ground, and tied to the guard with wire. The guard may be readily removed if necessary and again replaced. The points of excellence claimed for this guard are that it is light, neat and strong, admitting all the light and air to the tree; that it gives full protection against man and beast, and that it furnishes no joints or crevices for insects to lay eggs in.

Indurated Fiber Dip Basket.

The United Indurated Fiber Company, for whom Cordley & Hayes, 173-175 Duane street, New York, are agents, are introducing dip baskets for brass foundries, nickel plated works, and similar establish-

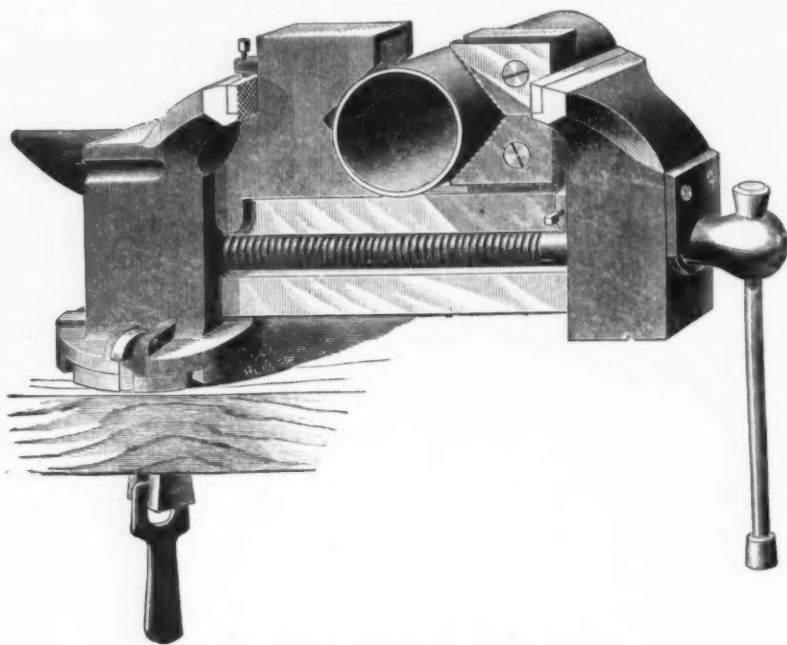
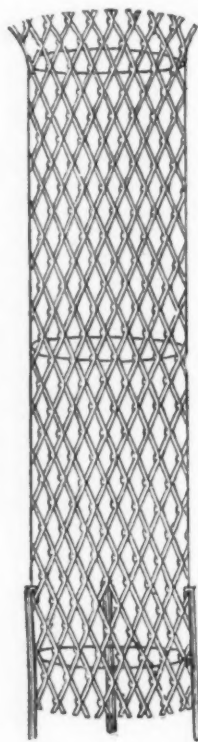


Fig. 1.—Combination Pipe and Bench Vise.

twisting when work is held out on the extreme end of the jaws, and also to prevent all jaw motion when used for heavy clipping. The bars are referred to as being firmly secured in the front jaw, and fitted in the back jaw, without a particle of lost motion; and being extra long allows the vise to open wide. The jaws are designed for strength and are unusually heavy, with a heavy steel face properly tempered. These vises all have a swivel base with a lock attachment to adjust them to positions right or left, and it is stated are held as firmly as a stationary vise. The point is made that the steel bars being narrow allow all work that has to pass down through the vise to be gripped

the form of a cylinder, 1 foot in diameter and 6 feet high. Three heavy wire rings are securely fastened to this cylinder, one in the middle and one near each end, the



Expanded Metal Guards.

ends being finished as a hook and eye. When placed around a tree the guard is sprung open sufficiently to admit the tree, when the ends of the wire rings are hooked into each other. Three rods having hooks



Indurated Fiber Dip Basket.

ments for scouring off castings. These are referred to as being light, easily handled, and far more durable and desirable in every way than the old-fashioned stone-ware baskets.

Cotton Seed Fork.

The Ashtabula Tool Company, Ashtabula, Ohio, are putting on the market a cotton seed fork for handling cotton seed, as illustrated herewith. These are made



Cotton Seed Fork.

in two sizes, 10 and 12 tines. They have improved strap ferrules and are referred to as meeting with the approval of those using them.

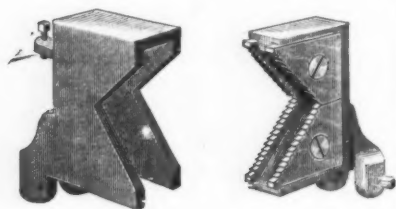


Fig. 2.—Pipe Attachment for Solid Machinist Vise.

close to the center of the jaws. A swivel attachment is provided, adapted for gripping taper pieces, which can be attached to the vise by placing the lower end in a hole provided for it in the upper bar directly below the movable jaw. Without this swivel attachment the result will be a parallel vise. By using the pipe attachment, Fig. 2, in combination with the bench vise, the result will be a pipe vise, as shown in Fig. 1. The pipe attachment, Fig. 2, is described as having the teeth in the jaw cut so as to enter the pipe at once

The Fifteen Finger Grain Cradle.

The Iowa Farming Tool Company, Fort Madison, Iowa, are putting on the market a 15-Finger Grain Cradle, as illustrated herewith. The fingers of the cradle are about $1\frac{1}{2}$ inches apart, to prevent grain from passing between them and being

It is referred to as being as well made and finished as the company's other hangers, but is a trifle lighter. Attention is called to the track, having brackets, which are bent so as to act as braces; also to the connections which are intended to make practically a solid continuous rail, to avoid jolting when the wheel passes from

the wires in place. At the top and bottom wide steel plates are connected in the same manner. These are fastened to the cross boards, thus uniting the ends of the screening surface firmly to the frame. It



The Fort Madison Fifteen Finger Grain Cradle.

lost. The fingers being supported at the outer end, the point is made that they are much stronger than regular makes; also, that it is a very light cradle. They are made in Morgan and turkey wing patterns, wood brace, and Dutch bow and Southern patterns, with iron brace. Any of the four patterns can be obtained in both prize patent loop, and also set screw, heel ring scythe fastenings.

The World's Fair Hanger.

The Coleman Hardware Company, Chicago, Ill., are introducing a barn door

one rail to the other, and to make it impossible for the ends of the rail to get loose and spring up or down or sideways.

Drendul's Sand Screen.

The Gilbert & Bennett Mfg. Company, Chicago and New York, are manufacturing the Drendul's Sand Screen, as illustrated in Fig. 1. A front view is given in Fig. 2 showing the manner of securing the wires to the steel plates, which are fastened to the frame at the top and bottom. Fig. 3 shows the way the wires are secured to the supporting rods, looking at

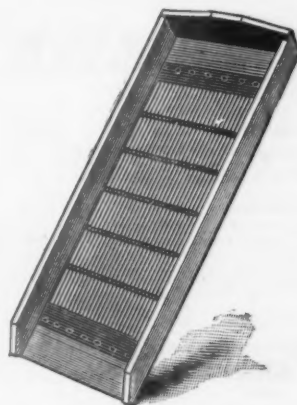


Fig. 1.—Drendul's Sand Screen.

is stated that the wires are heavier than used in common screens and that the frames are made of first-class lumber. All the metal used in their construction is steel. The following points of excellency are mentioned: That there are no small wires to wear out quickly, leaving the screening surface loose and uneven; that

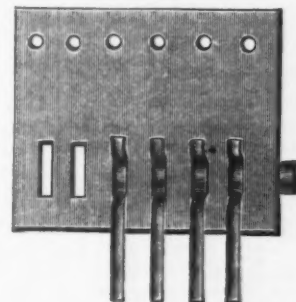


Fig. 2.—The Manner of Fastening the Wires at Top and Bottom of Screen.

the frames are not weakened by numerous holes bored to receive the end of the wires; that the surface is even, so the sand is not retarded in its downward course; that the wires cannot be displaced to form irregular openings, and that the screen is constructed so the wear will be borne propor-

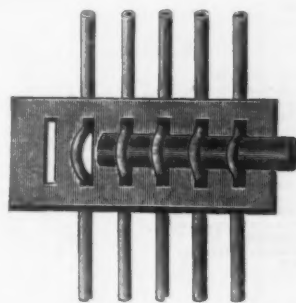
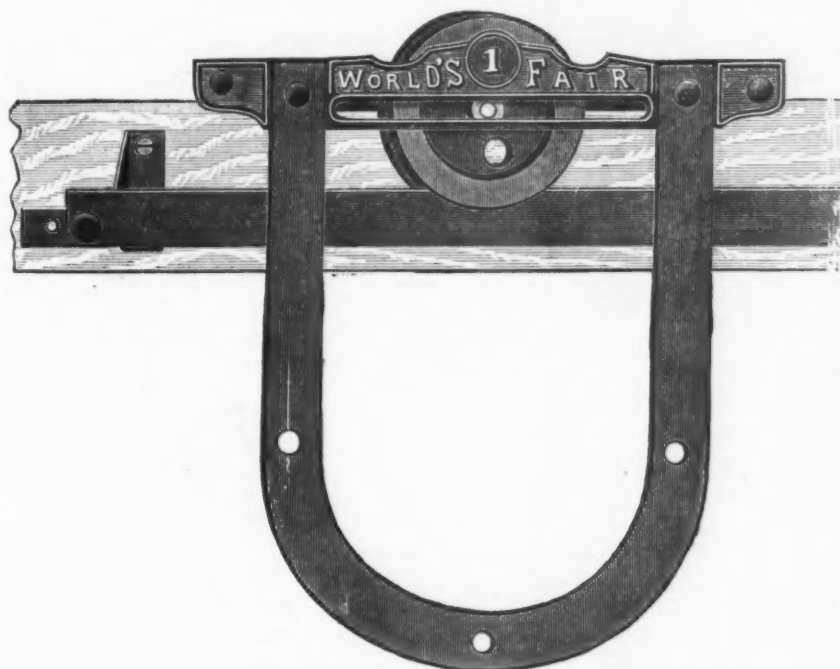


Fig. 3.—The Manner of Securing the Wires to the Supporting Rods.

tionately on all parts. The point is made that owing to the novel construction it will screen dry or wet sand rapidly.

The entire suspension of the electric light service in this city last week was prevented by an injunction restraining the cutting of the wires pending a settlement of complaints by all the companies of alleged extortionate charges for renting the subways—namely, \$750 per year for each mile of $2\frac{1}{2}$ inch duct.



The World's Fair Hanger.

hanger and bracket track, as illustrated herewith. This is described as being the same hanger, so far as the working is concerned, as their nickel and J. G. C. hangers. It has, however, a slotted rider bar, to prevent the wheel from falling out.

them from the back. It is described as having the heavy parallel wires looped to pass through slots punched uniformly in narrow strips of sheet steel. The supporting rods are passed through the loops at the back of the sheet steel to firmly hold

CURRENT HARDWARE PRICES.

OCTOBER 22, 1890.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Adjusters, Blind.

Domestic.....\$ doz \$3.00, 33¢
Excelsior.....\$ doz \$10.00...50¢10¢2¢
Washburn's Self-Locking.....20¢20¢10¢

Ammunition.—

Caps, Percussion, 1000—
Hicks & Goldmark's and Union Metallic
Cartridge Co.
F. L. Waterproof, 1-10's.....34¢35¢
E. B. Trimmer Edge, 1-10's.....46¢48¢
E. B. Grind. Edge, Cent. Fire, 1-10's.....46¢47¢
Musket Waterproof, 1-10's.....50¢
S. D.....28¢
S. B. Genuine Imported.....45¢
Eley's E. B.....54¢
Eley's D Waterproof, Central Fire.....\$1.00

Cartridges—

Rim Fire Cartridges.....50¢55¢2¢
Rim Fire Military.....15¢2¢
Cent. Fire, Pistol and Rifle.....25¢55¢2¢
Cent. Fire, Military and Sporting.....15¢55¢2¢
Blank Cartridges, except 22 and 32 cal.,
additional 10% on above discounts.....2¢
Blank Cartridges, 32 cal., \$1.75.....2¢
Blank Cartridges, 32 cal., \$3.50.....2¢
Primed Shells and Bullets.....15¢55¢2¢
B. B. Caps, Round Ball, \$1.75.....2¢
B. B. Caps, Con. Ball, Swg'd., \$2.00.....2¢

Primers—

erdan Primers, \$1.00.....2¢
B. L. Caps (for Sturtevant Shells) \$1.00.....2¢
All other Primers, \$1.20.....2¢

Shells—

First quality 4, 8, 10 and 12 gauge.....25¢10¢2¢
First quality, 14, 16 and 20 gauge (\$10
list).....30¢10¢2¢
Prize.....40¢2¢
Star, Club, Rival and Climax brands.....33¢10¢2¢
Seibold's Comb. Shot Shells.....15¢2¢
Brass Shot Shells, 1st quality.....60¢2¢
Brass Shot Shells, Club, Rival, Climax.....65¢2¢

Shells Loaded—

Standard List, July 19, 1890.....40¢10¢5¢
Wads—Price per M.
U. M. C. & W. R. A.—B. E., 11 up.....68¢
U. M. C. & W. R. A.—B. E., 9&10.....82¢
U. M. C. & W. R. A.—B. E., 8.....96¢
U. M. C. & W. R. A.—B. E., 7.....110¢
U. M. C. & W. R. A.—P. E., 11 up.....115¢
U. M. C. & W. R. A.—P. E., 9&10.....150¢
U. M. C. & W. R. A.—P. E., 8.....170¢
U. M. C. & W. R. A.—P. E., 7.....180¢
Eley's B. E., 11 up.....\$1.75
Eley's B. E., 11g30.....2.80

Anvils.—

Eagle Anvils, \$10.....15¢15¢5¢
Peter Wright's.....11¢
Armitage's Mouse Hole.....10¢10¢11¢
Armitage's Mouse Hole, Extra.....12¢12¢
Fenton.....10¢10¢10¢
Wilkinson's.....10¢10¢11¢
Moore & Barnes Mfg. Co.....33¢

Anvil Vise and Drill—

Millers Falls Co., \$18.00.....20¢
Cheney Anvil and Vise.....25¢
Allen Anvil and Vise, \$3.00.....40¢10¢
Star.....45¢5¢

Apple Parers—See Parers, Apple, &c.

Augers and Bits—

Douglas Mfg. Co.....70¢10¢
Wm. A. Ives & Co.....70¢10¢
Humphreysville Mfg. Co.....70¢10¢
French, Swift & Co. (F. H. Beecher.....70¢10¢
P. S. & W. Co.....70¢10¢
Rockford Bit Company.....70¢10¢
Cook's, Douglas Mfg. Co.....55¢
Cook's, N. H. Copper Co. 50¢10¢50¢10¢5¢
Ives' Circular Lip.....30¢
Patent Solid Head.....30¢
C. E. Jennings & Co., No. 10, extension
lip.....40¢
C. E. Jennings & Co., No. 30.....60¢
C. E. Jennings & Co., Auger Bits, 1/2
32¢ quarters, No. 35; No. 30, \$3.50, 20¢
Lewis' Patent Single Twist.....45¢
Russell Jennings' Augers and Bits 25¢10¢
Imitation Jennings' Bits.....60¢60¢5¢
Snell's Jennings Pattern.....60¢
Pugh's Black.....20¢
Rockford, Jennings' Pattern.....60¢60¢10¢
Car Bits.....60¢60¢10¢
Car Bits, P. S. & W. Co.....60¢10¢
Snell's Car Bits.....15¢10¢
Forstner Pat. Auger Bits.....10¢
Cincinnati Bell-Hangers' Bits.....30¢10¢

Bit Stock Drills—

Morse Twist Drills.....50¢10¢5¢
Standard.....60¢10¢5¢
Cleveland.....60¢10¢5¢
Syracuse.....50¢10¢5¢
Syracuse, for wood (wood list) 30¢30¢5¢
Williams' or Holt's, for metal 50¢10¢10¢
Williams' or Holt's, for wood.....40¢10¢
Cincinnati, for wood.....30¢10¢
Cincinnati, for metal.....45¢10¢

Expansive Bits—

Clarks' small, \$18; large, \$28.....35¢35¢5¢
Ives' No. 4, \$ doz \$00.....40¢
Swan's.....40¢
Steer's, No. 2, \$22; No. 3, \$22.....35¢
Searns' No. 2, \$48.....20¢

Gimlet Bits—

Common.....\$ gross \$2.75@3.25
Diamond.....\$ doz \$1.10.....25¢10¢
Bee.....25¢25¢5¢
Double Cut, Shepardson's.....45¢45¢10¢

Double Cut, Ct. Valley Mfg. Co.....30¢10¢
Double Cut, Hartwell's, \$ gro.....\$5.25
Double Cut, Douglass'.....40¢10¢
Double Cut, Ives'.....60¢60¢10¢
Hollow Augers—
Ives.....33¢4¢
French, Swift & Co.....33¢4¢10¢
Douglass'.....33¢4¢10¢
Bonney's Adjustable, \$ doz \$48.....40¢10¢
Stearns'.....30¢10¢
Ives' Expansive, each \$4.50.....50¢5¢
Universal Expansive, each \$4.50.....50¢5¢
Wood's.....25¢25¢10¢
Cincinnati Adjustable.....25¢10¢
Cincinnati Standard.....25¢10¢
Ship Augers and Bits—
L'Hommiedieu's.....15¢10¢15¢10¢5¢
Watrous'.....15¢10¢15¢10¢10¢
Snell's.....15¢10¢15¢10¢5¢
Snell's Ship Auger Pat'n Car Bits.....15¢10¢15¢10¢5¢

Awl Hafts—See Hafts, Awl.

Awls, Brad Sets, &c—
Awls, Sewing, Common.....\$ gr \$1.70, 35¢
Awls, Should, Peg.....\$ gr \$2.45, 40¢40¢10¢
Awls, Pat. Peg.....\$ gr 65¢.....40¢40¢10¢
Awls, Shouldered Brad.....27¢ gr.....35¢
Awls, Handled Scratch.....\$7.50 gr.....45¢
Awls, Handled Scratch \$ gr \$7.50, 35¢10¢
Awls, Socket Scratch, \$ doz, \$1.50, 25¢30¢
Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

First quality.....\$8.00.....\$8.50
Others.....7.50.....8.00

Axle Grease—See Grease, Axle.

Axles—

No. 1, 4¢@5¢, No. 2 5¢@6¢4¢
Nos. 7 to 14.....55¢5¢
Nos. 15 to 18.....47¢3¢
Nos. 19 to 22.....70¢
Concord Axles, loose collar.....5¢@6¢
Concord Axles, solid collar.....6¢@7¢
National Tubular Self-Oiling.....33¢4¢33¢4¢5¢

Bag Holders.—See Holders, Bag.

Balances—

Spring Balances.....No. 2000 20 30
Chatillon, \$ doz.....\$0.80, 0.95, 1.75 net
Chatillon Straight Balances.....40¢
Chatillon Circular Balances.....50¢10¢

Bars.

Crow—
Cast Steel.....\$ 4 1/4¢
Iron, Steel Points.....\$ 3 1/4¢

Basins, Wash—

Standard Fiberware, No. 1, 10 1/2-inch, \$3;
12-inch, \$2.25; 13 1/2-inch, \$2.75; 15-inch,
\$3.25.

Beams, Scale—

Scale Beams, List Jan. 12, '82.....50¢10¢
Chatillon's No. 1.....40¢
Chatillon's No. 2.....60¢
Custer's.....33¢4¢

Beaters, Egg, &c—

Keystone, P. D. & C., Each, No. 1, \$1; No. 2,
\$2.....20¢
Dover.....\$ doz \$1.50
Duplex (Standard Co.).....\$ doz \$1.25
Rival (Standard Co.).....\$ doz \$1.00
Duplex Extra Heavy (Standard Co.).....\$ doz \$5.00
Bryant's.....\$ gr \$14.00
Double (H. & R. Mfg. Co.) \$ gr No. 0,
\$12.00; No. 1, \$15.00; No. 2.....\$36.00
Easy (H. & R. Mfg. Co.).....\$ gr \$12.00
Triple (H. & R. Mfg. Co.).....\$ gr \$15.50
Spiral (H. & R. Mfg. Co.).....\$ gr \$4.50
Improved Acme (H. & R. Mfg. Co.).....\$ gr \$2.00
Paine, Diehl & Co.'s.....\$ gr \$24.00
Silver & Co.....\$ doz \$5.50

Bells—

Cow—
Common Wrought.....60¢10¢
Western.....20¢10¢
Western, Sargent's list.....70¢10¢
Kentucky, Star.....20¢10¢
Kentucky, Sargent's list.....70¢10¢
Dodge, Genuine Kentucky.....70¢70¢10¢
Texas Star.....50¢10¢50¢10¢5¢
Call.....40¢40¢10¢
Farm Bells.....\$ 36¢34¢
Steel Alloy Church and School Bells.....40¢

Door—

Gong, Abbe's.....33¢4¢10¢
Gong, Yankee.....45¢10¢
Gong, Barton's.....40¢10¢50¢
Crank, Taylor's.....25¢10¢
Crank Brooks'.....50¢10¢2¢
Crank Cone's.....10¢
Crank, Connell's.....20¢10¢
Lever, Sargent's.....60¢10¢
Lever, Taylor's Bronzed or Plated.....net
Lever, Taylor's Japanned.....25¢10¢
Lever, R. E. M. Co.'s.....50¢10¢2¢
Pull, Brook's.....50¢10¢2¢
Pull, Western.....25¢10¢
Electric.....20¢
Wollensak's.....20¢
Bigelow & Dowse.....20¢
Taylor's.....20¢

Hand—

Light Brass.....75¢10¢
Extra Heavy.....55¢10¢
White Metal.....60¢10¢10¢
Silver Chime.....33¢4¢10¢
Globe (Cone's Patent).....25¢10¢35¢

Bellows—

Blacksmiths'.....60¢5¢65¢
Molders'.....40¢40¢10¢
Band Bellows.....40¢10¢50¢

Belt, Rubber—

Common Standard.....70¢70¢5¢
Standard.....60¢10¢10¢70¢
Extra.....50¢10¢40¢
N. Y. B. & P. Co., Carbon.....50¢50¢10¢5¢
N. Y. B. & P. Co., Diamond.....40¢50¢40¢10¢

Bench Stops—See Stops, Bench.

Benders, Upsetters, Tire.

Stoddard's Lightning Tire Upsetters.....15¢
Detroit Perfected Tire Bender.....15¢

Bits—

Auger, Gimlet, Bit Stock, Drills, &c.,
see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters,
Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Ordinary Tackle, list May 20, 1889.....
See Trade Report.

Cleveland Block Co., Mal. Iron.....50¢

Moore's Novelty, Mal. Iron.....50¢

Wood Lined "Crystal".....50¢

"Embossed".....50¢
"Oxidized".....45¢
Paper Lined Zinc.....55¢
"Crystal".....55¢
"Embossed".....55¢
"Oxidized".....45¢

Bolts—

Carriage, Machine, &c.—
Genuine Eagle, list Oct. '84.....70¢10¢5¢2¢
Phila. pattern, list Oct. 7, '84.....80¢80¢10¢
R. B. & W., old list.....70¢
Machine, list Jan. 1, 1890.....75¢10¢75¢10¢5¢

Bolt Ends, list Jan. 1, 1890.....75¢10¢75¢10¢5¢

Door and Shutter—
Cast Iron Barrel, Square, &c.....70¢70¢10¢
Cast Iron Shutter Bolts.....70¢70¢10¢
Cast Iron Chain (Sargent's list).....65¢10¢
Wrought Barrel.....70¢70¢10¢
Wrought Square.....70¢70¢10¢
Wrt Shutter, all Iron, Stanley's.....60¢10¢
Wrt Shutter, Brass Knob.....40¢10¢
Wrt Shutter, Sargent's list.....60¢10¢
Wrt Sunk Flush, Sargent's list.....55¢10¢
Wrt Sunk Flush, Stanley's list.....55¢10¢
Wrt B.K. Flush, Com'n.....55¢10¢

Stove and Plow—

Stove.....60¢
Plow.....60¢5¢
R. B. & W., Plow.....55¢

Common, list Feb. 28, '83.....65¢

Port Chester Bolt and Nut Company:
Empire, list Feb. 28, '83.....65¢
Keystone, Philadel., list Oct. '84.....80¢
Norway, Phila., list Oct. '84.....75¢
American Screw Company.....75¢
Norway, Phil., list Oct. 16, '84.....80¢
Eagle, Phil., list Oct. 16, '84.....80¢
Philadel., list Oct. 16, '84.....80¢
Bay State, list Feb. 28, '83.....65¢
R. B. & W., Philadel., list Oct. 16, '84.....80¢

Bores, Tap.

Common and Kind.....20¢10¢
Ive's Tap Bore.....33¢3¢5¢
Terprie Mfg. Co.....30¢10¢30¢
Clark's.....\$ 9 1/4¢10¢4¢

Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon.

Per D.....24¢

Braces—

American Bit Brace Co.:
Nos. 10, 12, 20.....60¢10¢
Nos. 11, 21, 24, 27.....70¢10¢
Nos. 22, 23, 25.....80¢10¢5¢
Nos. 13, 26, 36, 37.....70¢10¢5¢
Ball Braces, net.....\$1.12 to \$1.25¢
Amidon's
Barker's Imp'd Plain.....75¢10¢80¢
Barker's Imp. Nickeled.....65¢10¢70¢
Ratchet, Polished.....75¢10¢80¢
Eclipse Ratchet.....60¢5¢
Globe Jawed.....40¢40¢10¢
Corner Brace.....40¢40¢10¢
Universal, 8 in., \$2.10 10 in.....\$2.25
Buffalo Ball.....\$1.10¢\$1.15

Barber's.....60¢

Nos. 10 to 16.....60¢
Nos. 30 to 33.....60¢
Nos. 40 to 63.....50¢10¢

Saxton's.....75¢10¢80¢

Barker's Imp. Polished.....75¢10¢80¢
Barker's Imp. Nickeled.....65¢10¢70¢
Ratchet, Polished.....50¢10¢60¢
Eclipse Ratchet.....40¢10¢50¢
Buffalo Ball.....net, \$1.10¢\$1.15

Bartholomew's.....50¢10¢60¢5¢

Nos. 117, 118, 119.....70¢70¢5¢
Common Ball, American.....\$1.00¢\$1.05¢
Fray's Genuine Spofford's.....50¢50¢10¢
Fray's No. 70 to 120, 81 to 123, 207 to 414.....50¢10¢

Ives' New Haven Novelty.....70¢70¢5¢

New Haven Ratchet.....60¢5¢60¢10¢
Barber Ratchet.....60¢5¢60¢10¢
Barbers.....60¢5¢
Spofford.....60¢50¢10¢
Osmond's Ratchet.....40¢10¢50¢
P. S. & W. Co., Peck's Patent.....60¢

Brackets—

Shelf plain, Sargent's list, 55¢10¢55¢
Shelf, fancy, Sargent's list, 60¢10¢60¢
Reading, plain.....50¢10¢60¢10¢5¢
Reading, Rosette.....60¢10¢60¢10¢10¢

Bright Wire Goods—See Wire.

Broilers—

Hens' Self-Inch.....9 10 2 1/2
Bast Per doz.....\$4.50 5.50 6.50
New Haven.....50¢

Buckets, Well.

Galvanized—

Hill's.....\$ doz, 12 qt, \$4.25; 14 qt, \$5.25
Iron Clad.....\$ doz, 14 qt, \$4.25@4.50
Helwig's Flat Iron Band.....\$4.25@4.50
Helwig's Wired Top.....\$ doz \$4.00@4.25

Bull Rings—See Rings, Bull.

Butcher's Cleavers—See Cleavers

Butchers'.

Butts—

Brass—

Wrought Brass.....75¢10¢80¢
Cast Brass, Tack.....50¢
Cast Brass, Corbin's, Fast.....33¢4¢10¢
Cast Brass, Loose Joint.....33¢4¢10¢

Cast Iron—

Fast Joint, Narrow.....60¢10¢5¢60¢
Fast Joint, Broad.....60¢10¢60¢

Loose Joint.....70¢10¢

Loose Joint, Japanned.....70¢10¢
Loose Joint, Jap. with Acorns.....70¢10¢
Mayer's Hinges.....70¢10¢
Loose Pin, Acorns.....70¢10¢
Loose Pin, Acorns, Japanned.....70¢10¢
Loose Pin, Acorns, Japanned,
Plated Tips.....70¢10¢

Wrought Steel—

Fast Joint, Narrow.....70¢10¢
Fast Joint, L. Narrow.....70¢10¢
Fast Joint, Broad.....70¢10¢
Loose Joint, Broad.....70¢10¢
Table Butts, Back Flaps, &c.....70¢10¢
Inside Blind, Regular.....70¢10¢
Inside Blind, Light.....70¢10¢
Loose Pin.....70¢10¢
Bronzed Wrought Butts.....80¢

Calipers—See Compasses.

Calks, Toe—

Gautier.....\$ 5 1/4¢6¢
Dewicks (Burke).....\$ 5 1/4¢6¢

Can Openers—See Openers, Can.

Cards—

Horse & Curry.....10¢10¢10¢10¢
Cotton.....10¢10¢10¢
Wool.....10¢10¢10¢

Carpet Stretchers—See Stretchers

Carpet.

Carpet Sweepers—See Sw

Carpet.

Cartridges—See Ammunition.

Casters—

Bed.....Brass.....55¢55¢10¢
Plate.....Others.....60¢60¢10¢
Shallow Socket.....40¢10¢
Deep Socket.....40¢10¢
Yale Casters, list May, 1884.....80¢10¢40¢
Fale, Gem.....90¢60¢5¢
Martin's Patent (Phenix).....45¢10¢5¢
Payson's Anti-Friction.....60¢60¢10¢
Giant Truck Casters.....30¢
Stationary Truck Casters.....60¢10¢
Socket Truck Casters.....50¢

Cattle Leaders—See Leaders, Cattle.

Chain—

Trace, Wagon and Fancy Chains,
List revised April 21, 1890.....50¢
10¢60¢

American Coll, in cask lots,.....50¢

3-16 1/4 5-16 3/4 7-16 1/2 9/16 1/2
\$7.75 5.45 4.55 4.00 3.65 3.50 3.40 3.30
Less than cask lots, add 1/4¢@1/2¢ lb.

German Coll, list Oct. 6, 1890.....50¢10¢5¢60¢

German Halter Chain, list Oct. 6, 1890.....50¢10¢5¢60¢

Covert Halter.....60¢2¢

Covert Traces.....35¢2¢
Covert Heel Chain.....50¢2¢
Onclia Halter Chain.....60¢60¢5¢
Galvanized Pump Chain.....\$ 5 1/4¢6¢
Jack Chain, Iron.....75¢10¢80¢
Jack Chain, Brass.....75¢75¢10¢

Chalk—

White.....\$ gr 50¢
Red.....\$ gr 70¢
Blue.....\$

1 Gem....

Chucks.

Beach Pat. each, \$5.00, 25¢

Morse's Adjustable, each, \$7.00, 20¢

Danbury, each, \$6.00, 30¢

Syracuse, each, \$6.00, 30¢

Skinner's Patent Chucks. 25¢

Combination Lathe Chucks. 39¢

Universal Lathe Chucks. 40¢

Independent Lathe Chucks. 40¢

Drill Chucks. 15¢

Union Mfg. Co.,

Victor, each, \$8.50, 25¢

Combination, 40¢

Universal, 40¢

Independent, 40¢

Churns.

Tiffin Union No. 1, 5 gallon, \$3.25 each

Tiffin Union No. 2, 7 gallon, \$3.75 each

Tiffin Union No. 3, 10 gallon, \$4.25 each

Clamps—

R. I. Tool Co.'s Wrought Iron, 25¢

Adjustable, Cincinnati, 15¢

Adjustable, Hammers, 15¢

Adjustable, Steam's, 30¢

Steam's Adjustable Cabinet and Corner, 30¢

Cabinet, Sargent's, 60¢

Carriage Makers', Sargent's, 70¢

Carriage Makers', P. S. & W. Co., 40¢

Eberhard Mfg. Co., 40¢

Warner's, 40¢

Clamp, See Vices, Saw Filers', 25¢

Carpenters', Cincinnati, 25¢

Cleavers.

Butchers'.

Bradley's, 25¢

L. & J. White, 20¢

Beatty's, 40¢

New Haven Edge Tool Co.'s, 40¢

P. S. & W., 40¢

Fourer Bros., 40¢

Schulte, Lohoff & Co., 40¢

Clips—

Norway, Axle, 1/4 & 5-16, 55¢

2nd grade Norway Axle, 1/4 & 5-16, 65¢

Superior Axle Clips, 60¢

Norway Spring Bar Clips, 5-16, 60¢

Wrought Iron Felice Clips, 5-16, 5¢

Felice Clips, 5-16, 5¢

Baker Axle Clips, 5¢

Cloth and Netting, Wire—See Wire, &c.

Cockeyes. 50¢

Cocks, Brass.

Hardware list, 50¢

Coffee Mills—See Mills, Coffee.

Collars, Dog, &c.

Melford Fancy Goods Co., 40¢

Embossed, Gift, Pope & Steven's list, 30¢

Leather, Pope & Steven's list, 40¢

Brass, Pope & Steven's list, 40¢

Chapman Mfg. Company, 50¢

Combs, Curry.

Fitch's, 50¢

Rubber, per doz \$10.00, 20¢

Perfect, 50¢

Compasses, Dividers, &c.—

Compasses, Calipers, Dividers, 70¢

Bemis & Call Co.'s

Dividers, 60¢

Compasses & Calipers, 50¢

Wing and Inside or Outside, 50¢

Double, 60¢

Cable's Pat. Inside, 30¢

Excelsior, 30¢

J. Stevens & Co.'s, 25¢

Starrett's

Spring Calipers and Dividers, 25¢

Lock Calipers and Dividers, 25¢

Combination Dividers, 25¢

Coopers' Tools—See Tools, Coopers'.

Cord, Sash—

Common, 10¢

Patent, good quality, 15¢

White Cotton Braided, fair, 15¢

Common Braid Sash, 15¢

Patent, 15¢

Cable Laid Italian Sash, 22¢

Indian Cable Laid, 13¢

Silver Lake, 13¢

A Quality, White, 50¢

A Quality, Drab, 50¢

B Quality, White, 50¢

B Quality, Drab, 50¢

C Quality, White (only), 26¢

Sylvan Spring, Extra Braided, White, 34¢

Sylvan Spring, Extra Braided, Drab, 34¢

Seamer Idem, Braided, White, 34¢

Egyptian, India Hemp, Braided, 25¢

Samson—

Braided, White Cotton, 50¢

Braided, Drab Cotton, 50¢

Braided, Italian Hemp, 55¢

Braided, Lichen, 80¢

Corkscrews—See Screws, Cork.

Corn Knives and Cutters—See Knives, Corn.

Crackers, Nut—

Table (H. & B. Mfg. Co.), 40¢

Blake's Pattern, 40¢

Turner & Seymour Mfg. Co., 50¢

Cradles—

Grain, 50¢

Crayons.

White Crayons, 12¢

D. M. Steward Mfg. Co., Metal Workers, 82¢

M. Steward Mfg. Co., Rolling Mill, 25¢

Over 5¢, 25¢

See also Chalk.

Crow Bars—See Bars, Crow.

Curry Combs—See Combs, Curry.

Curtain Plug—See Plugs, Curtain.

Cutters.

Meat.

Dixon's # dos, 40¢

Nos., \$14.00 \$17.00 \$19.00 \$20.00

Woodruff's # dos, 40¢

Nos., 100 150

\$15.00 \$18.00

70¢/70¢

11 12 13

\$27.00 \$33.00 \$45.00

American, 30¢

Nos., 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Each, \$5 \$7 \$10 \$25 \$50 \$60

Nos., 10 12 22 32 42

Each, \$3 \$2.50 \$4 \$8 \$15

Great American Meat Cutter, 39¢

Nos., 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100

Each, \$2.00 \$2.75 \$3.00 \$2.50 \$1.00

Miles' Challenge # dos, 45¢

Nos., 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

\$22.00 \$30.00 \$40.00

Home No. 1, # dos, \$26.00, 55¢

Draw Cut, each, 3 6 8

\$50 \$75 \$90 \$225, 20¢

Great American, 30¢

Beef Shavers (Enterprise), 20¢

Little Giant, 50¢

Chadborn's Smoked Beef Cutter, # dos \$95.00

Tobacco.

Champion, 20¢

Wood Bottom, # dos \$5.00, 45¢

All Iron, # dos \$4.25

Nashua Lock Co.'s, # dos, \$18.00 50¢

Wilson's, 55¢

Sargent's, # dos, \$24, 55¢

Acme, # dos \$30.00, 40¢

Washer.

Smith's Pat., # dos \$12.00, 20¢

Johnson's, # dos \$11.00, 39¢

Penny's, # dos \$14, Jap'd, \$16.00, 55¢

Appleton's, # dos \$16.00, 60¢

Bonney's, 30¢

Cincinnati, 25¢

Cutlery—

Reaver Falls & Booth's, 39¢

Wostenholme, \$7.75 to 2

Dampers, &c—

Dampers, Buffalo, 40¢

Buffalo Damper Clips, 40¢

Crown Damper, 40¢

Excelsior, 40¢

Diggers, Post Hole, &c.—

Samson Post Hole Digger, # dos \$38.00, 25¢

Fletcher Post Hole Augers, # dos \$36, 20¢

Eureka Diggers, # dos \$12.50, 14.00

Lead's, # dos \$8.00, 9.00

Vaughan's Post Hole Auger, # dos \$13.00, 14.00

Kohler's Little Giant, # dos, \$18.00

Kohler's Hercules, # dos, 15.00

Kohler New Champion, # dos, \$9.00

Schneider, # dos, \$18.00

Ryan's Post Hole Diggers, # dos \$24.00

Cronk's Post Bars, # dos \$60.00, 50¢

Gibbs Post Hole Digger, # dos \$30.00, 50¢

Imperial, # dos \$15, 45¢

Dividers—

See Compasses.

Dog Collars—See Collars, Dog, &c.

Door Springs—See Springs, Door.

Drawers.

Money, # dos, \$18¢

Drawing Knives—See Knives, Drawing.

Drills and Drill Stocks—

Blacksmiths', each \$1.75

Blacksmith's Self-Feeding, each \$7.50, 20¢

Breast, P. S. & W., 40¢

Cleveland, 30¢

Breast, Millers Falls, each \$3.00, 25¢

Breast, Bartholomew's, each \$2.50, 25¢

Ratchet, Merrill's, 20¢

Ratchet, Ingersoll's, 25¢

Ratchet, Park & Stock, 30¢

Ratchet, Whitner's, 20¢

Ratchet, Weston's, 20¢

Ratchet, Moore's Triple Action, 25¢

Ratchet, Curtis & Curtis, 30¢

Whitney's Hand Drill, Plain, \$11.00, 30¢

Adjustable, \$12.00, 30¢

Cleveland, 30¢

Automatic Boring Tools, \$1.75 to \$1.85

Twist Drills—

Morse, 50¢

Standard, 50¢

Syracuse (Metal list), 50¢

Williams, 50¢

New Process, 50¢

Drill Bits—See Augers and Bits.

Drill Chucks—See Chucks.

Dripping Pans—See Pans, Dripping.

Drivers, Screw.

Douglas Mfg. Co., 20¢

Dixon's, 60¢

Buck Bros., 30¢

Stanley R. & L. Co.'s

Varnished Handles, 65¢

Black Handles, 60¢

Sargent's Dr. Co.'s

No. 1 Forged Blade, 60¢

Nos. 20, 30 and 60, 60¢

P. S. & W., 70¢

Knapp & Cowles No. 1, 60¢

No. 5 Extra, 60¢

Nos. 6 & 4, 60¢

Stearns', 25¢

Gay & Parsons, 30¢

Champion, 25¢

Clark's Pat., 30¢

Crawford's Adjustable, 30¢

Ellrich's Socket and Ratchet, 25¢

Hard's Spiral, new list, 25¢

Killb's Common Screw, 30¢

Syracuse Screw-Driver Bits, 30¢

Screw-Driver Bits, # dos, 60¢

Screw-Driver Bits, Parr's, # gro \$6.25

Fray's Hol. Hds. Sets. No. 3, \$12.00, 25¢

P. D. & Co.'s all Steel, 50¢

Cincinnati, 25¢

Brace Screw Drivers, 25¢

Buck Bros. Screw-Driver Bits, 25¢

Egg Beaters.—See Beaters, Egg.

Egg Poachers.—See Poachers, Egg.

Electric Bell Sets.—See Bells, Electric.

Emery. — No. 4 to No. 54 to Flour, CF F. W. F.

Kegs, # 4, 46 gr. 5 16 gr. 21¢

10 kegs, # 4, 46 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

10 kegs, # 5, 5 16 gr. 5 16 gr. 21¢

Roggin's Latches..... \$ doz 80¢@35¢
 Bronze Iron Drop Latches, \$ doz 70¢ net
 Jap'd Store Door Handles—Nuts, \$1.02, net
 Plate, \$1.10; no Plate, \$0.88..... net
 Barn Door, \$ doz \$1.40..... 10¢10¢
 Chest and Lifting..... 70¢

Wood—

Saw and Plane..... 40¢10¢@40¢10¢5¢
 Hammer, Hatchet, Axe, Sledge, &c., 40¢
 Brad Awl..... \$ gr 2.00
 Hickory Firmer Chisel, ass'd., \$ gr 4.50
 Hickory Firmer Chisel, large, \$ gr 5.00
 Apple Firmer Chisel, ass'd., \$ gr 5.00
 Apple Firmer Chisel, large, \$ gr 5.00
 Socket Firmer Chisel, ass'd., \$ gr 3.00
 Socket Framing Chisel, ass'd., \$ gr 5.00
 J. S. Smith & Co.'s Pat File..... 50¢
 File, assorted..... \$ gr 2.75
 Auger, assorted..... \$ gr 5.00
 Pat. Auger, large..... \$ gr 7.00
 Pat. Auger, Douglas..... \$ set 1.25
 Pat. Auger, Swan's..... \$ set 1.00
 Hoe, Rake, Shovel, &c..... 50¢10¢

Hangers—

Barn Door, old patterns..... 60¢10¢10¢@70¢
 Barn Door, New England..... 60¢10¢10¢@70¢
 Samson Steel Anti-Friction..... 55¢
 Orleans Steel..... 55¢
 Hamilton Wrought Wood Track..... 55¢
 U. S. Wood Track..... 55¢
 Champion..... 60¢10¢
 Rider and Wooster, Medina Mfg. Co.'s
 list..... 70¢
 Climax Anti-Friction..... 60¢
 Climax Anti-Friction for Wood Tracks..... 55¢
 Zenith for Wood Track..... 55¢
 Reed's Steel Arm..... 50¢
 Challenge, Barn Door..... 50¢
 Sterling's Improved Anti-Friction..... 55¢10¢
 Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3,
 \$18.00..... 50¢2¢
 Cheritree..... 50¢10¢
 Kidder's..... 50¢10¢@60¢
 The Boss..... 60¢10¢
 Best Anti-Friction..... 60¢10¢
 Duplex (Wood Track)..... 60¢10¢5¢
 Terry's Pat., \$ doz pr 4 in, \$10.00; 5 in,
 \$12.00..... 50¢10¢
 Terry's Steel Anti-Friction Leader 50¢10¢
 Terry's Steel Anti-Friction Ideal..... 50¢10¢
 Cronk's Patent, Steel Covered..... 50¢5¢
 Wood Track Iron Clad, \$ ft. 10¢..... 50¢
 Carrier Steel Anti-Friction..... 50¢10¢
 Architect, \$ set \$6.00..... 20¢
 Eclipse..... 20¢10¢
 Felix, \$ set \$4.50..... 20¢10¢
 Richards'..... 30¢30¢10¢
 Lane's Standard..... 50¢5¢50¢10¢
 Lane's New Standard..... 50¢50¢5¢
 Ball Bearing Door Hanger..... 50¢10¢25¢10¢
 Warner's Pat..... 20¢10¢20¢10¢10¢
 Stearns' Anti-Friction..... 20¢10¢20¢10¢
 Stearns' Challenge..... 25¢10¢25¢10¢10¢
 Faultless..... 40¢40¢5¢
 American, \$ set \$6.00..... 20¢10¢
 Rider & Wooster, No. 1, 62¢; No. 2,
 70¢..... 40¢
 Paragon, Nos. 1, 2 and 3..... 40¢10¢
 Cincinnati..... 40¢10¢
 Paragon, Nos. 5, 5½, 7 and 8..... 20¢10¢
 Crescent..... 60¢60¢10¢
 Nickel Cast Iron..... 50¢
 Nickel, Malleable Iron and Steel..... 40¢
 Scranton Anti-Friction Single Strap..... 35¢
 Wild West, 4 in. Wheel, \$15.00; 5 in.,
 \$21.00..... 45¢
 Star..... 40¢10¢40¢10¢5¢
 May..... 50¢5¢50¢10¢
 Barry, \$6.00..... 40¢10¢

Harness Snaps—See Snaps.

Hatchets—

American Axe and Tool Co.
 Blood's..... 50¢5¢10¢
 Hunt's..... 70¢2¢
 Hurd's..... 70¢2¢
 Mann's..... 50¢
 Peck's..... 40 & 10
 Underhill's..... 40 & 10
 Buffalo Hammer Co..... 50¢5¢
 Fayette R. Plumb..... 50¢5¢
 C. Hammond & Son..... 50¢5¢
 Kelly's..... 50¢5¢
 Sargent & Co..... 50¢5¢
 P. S. & W. Co..... 50¢5¢
 Ten Eyck Edge Tool Co..... 50¢5¢
 Collins..... 10¢
 Schulte, Lohoff & Co..... 50¢50¢5¢
 Hay and Straw Knives—See
 Knives.

Hinges—

Blind Hinges—
 Parker..... 75¢2¢
 Palmer..... 50¢5¢10¢
 Seymour..... 70¢2¢
 Huffer..... 50¢
 Clark's, Nos. 1, 3, 5, 40 and 50..... 75¢10¢5¢80¢
 Clark's Mortise Gravity..... 50¢
 Sargent's, Nos. 1, 3, 5, 11, 13..... 75¢10¢55¢10¢5¢
 Sargent's, No. 12..... 77¢10¢10¢
 Reading's Gravity..... 75¢10¢75¢10¢5¢
 Shepard's..... 75¢10¢
 Noiseless..... 80¢
 Niagara..... 80¢
 Buffalo..... 80¢
 Clark's Genuine Pattern..... 80¢
 O. S., Lull & Porter..... 75¢10¢
 Acme, Lull & Porter..... 75¢
 Queen City Reversible..... 70¢10¢8¢70¢
 Clark's Lull & Porter, Nos. 0, 1, 2,
 2½, 3..... 75¢10¢2¢5¢
 North's Automatic Blind Hinges, No.
 2, for Wood, \$9.00; No. 3, for Brick,
 \$11.50..... 10¢
 Gate Hinges—
 Western..... \$ doz \$4.40, 60¢
 N. E..... \$ doz \$7.00, 55¢
 N. E. Reversible..... \$ doz \$5.20, 55¢10¢
 Clark's, Nos. 1, 2, 3..... 60¢8¢2¢5¢
 V. Y. State..... \$ doz \$5.00, 55¢10¢
 Automatic..... \$ doz \$12.50, 50¢
 Common Sense..... \$ doz pair \$4.50, 50¢
 Seymour's..... 45¢10¢
 Shepard's..... 60¢10¢5¢
 Reed's Latch and Hinges..... \$ doz \$12.00, 50¢

Spring Hinges—

Union Spring and Blank Butts..... 40¢
 Gear Spring Hinge Co.'s list, March,
 1886..... 20¢

Acme..... 30¢
 J. S..... 25¢10¢
 Empire and Crown..... 20¢
 Hero and Monarch..... 20¢
 American, Gem, and Star..... 20¢
 Oxford..... 20¢
 Barker's Double Acting..... 25¢
 Union Mfg. Co..... 25¢
 Bommer's..... 30¢
 Buckman's..... 15¢20¢
 Chicago..... 30¢
 Wiles..... 10¢
 Devore's..... 40¢
 Rex..... 40¢
 Royal..... 40¢
 Reliable..... 60¢
 Champion..... 60¢
 Bardsley's Patent..... 40¢
 Stearn's..... 50¢10¢

Wrought Iron Hinges

Strap and T..... 75¢10¢
 Screw Hook and..... 14 to 20 in., \$ 3.7-10¢
 Strap..... 22 to 36 in., \$ 3.2-10¢
 Heavy Welded..... 6 to 12 in., \$ 4.2-10¢
 Hook..... 14 to 20 in., \$ 3.7-10¢
 Screw Hook..... 22 to 36 in., \$ 3.2-10¢
 and Eye..... ½ in., \$ doz \$1.50
 ¾ in., \$ doz \$2.45
 1 in., \$ doz \$3.80
 Rolled Blind Hinges, Nos. 32 and 34..... 50¢10¢
 Rolled Blind Hinges, Nos. 232 and 234..... 50¢10¢
 Rolled Plate..... 55¢10¢
 Rolled Raised..... 70¢10¢
 Plate Hinges { 8, 10 & 12 in., \$ 4-10¢
 "Providence" } over 12 in., \$ 4-10¢

Hoes—

Eye—
 D. & H. Scovill..... 20¢
 Lane's Crescent Planter Pattern..... 45¢5¢
 Lane's Razor Blade, Scovill Pattern..... 30¢
 Maynard, S. & O. Pat..... 45¢5¢
 Sandusky Tool Co., S. & O. Pat..... 50¢10¢5¢
 Am. Axe and Tool Co., S. & O..... 60¢
 Chattanooga Tool Co., S. & O. Pat..... 50¢60¢10¢
 Grub..... 60¢10¢
 Garden, Mortar, &c..... 60¢5¢70¢
 Planter's, Cotton, &c..... 60¢5¢70¢
 Warren Hoe..... 60¢
 Magic..... \$ doz \$4.00

Hog Rings and Rings—See Rings and Rings.

Holding Apparatus—See Machines, Holding.

Hollow-Ware—See Ware, Hollow.

Holders.

Bag.
 Sprengle's Pat..... \$ doz \$18..... 60¢
 Bit.
 Extension,
 Barber's, \$ doz \$15.00..... 40¢40¢10¢
 Ives, \$ doz \$20.00..... 60¢5¢60¢10¢
 Diagonal..... \$ doz \$24.00, 40¢
 Angular..... \$ doz \$24.00, 40¢5¢
 File and Tool—
 Balz Pat..... \$ doz \$4.00; 25¢
 Nicholson File Holders..... 20¢
 Dick's Tool Holder..... 20¢

Hooks—

Cast Iron—
 Bird Cage, Sargent's list..... 60¢10¢10¢
 Bird Cage, Reading's list..... 60¢10¢10¢
 Clothes Line, Sargent's list..... 60¢10¢10¢
 Clothes Line, Reading list..... 60¢10¢10¢
 Ceiling Sargent's list..... 55¢10¢55¢10¢10¢
 Harness, Reading list..... 55¢10¢55¢10¢10¢
 Coat and Hat, Sargent's list..... 55¢10¢55¢10¢10¢
 Coat and Hat, Reading..... 50¢10¢50¢10¢10¢
 Wrought Iron—
 Cotton..... \$ doz \$1.25
 Cotton Pat. (N.Y. Mallet & Handle W'ks.)..... 30¢
 Tassel and Picture (T. & S. Mfg. Co.)..... 50¢
 Wrought Staples, Hooks, &c..... See Wrought Goods.
 Wire—
 Wire Coat and Hat, Gem, list April,
 1886..... 50¢
 Wire Coat and Hat, Miles, list April,
 1886..... 50¢
 Indestructible Coat and Hat..... 45¢
 Wire Coat and Hat, Standard..... 60¢
 Handy Hat and Coat..... 50¢10¢
 Steady Ceiling Hooks..... 50¢10¢
 Belt..... 80¢80¢10¢
 Atlas, Coat and Hat..... 60¢

Miscellaneous.

Grass, No. 2, \$2.00; No. 3, \$2.25; No. 4, \$2.50
 Nolin's Grass..... \$ doz \$2.25
 Bush..... 55¢60¢
 Whitfield Patent..... 55¢
 Hooks and Eyes—Malleable Iron..... 70¢70¢10¢
 Hooks and Eyes—Brass..... 60¢10¢10¢
 Fish Hooks, American..... 50¢
 Bench Hooks..... See Bench Stops.

Horse Nails—See Nails, Horse.

Horse Shoes—See Shoes, Horse.

Hose, Rubber—

Competition..... 75¢75¢5¢
 Standard..... 60¢10¢5¢60¢10¢
 Extra..... 40¢10¢60¢
 N. Y. B. & P. Co., Para..... 25¢5¢
 N. Y. B. & P. Co., Extra..... 40¢40¢5¢
 N. Y. B. & P. Co., Dundee..... 40¢10¢60¢

Huskers—

Blair's Adjustable..... \$ gr 83.00
 Blair's Adjustable Clipper..... \$ gr 7.00
 Hubbard's Solid Steel..... \$ gr 4.50

Indurated Fiber-Ware—See Ware, Indurated Fiber.

Irons.

Sad—
 From 4 to 10, at factory..... \$ 100 B.
 Self-Heating..... \$2.30@24.40
 Self-Heating, Tailors'..... \$ doz \$18.00 net
 Mrs. Pott's Irons..... 50¢5¢
 Enterprise Star Irons..... 50¢5¢
 Cold Handle Sad Irons..... 20¢5¢

Ideal Irons new list..... 50¢10¢50¢10¢10¢
 Salamander, Irons..... 25¢
 B. B. Sad Irons, \$ doz..... 3 @ 3½¢
 Combined Fluter and Sad Iron, \$ doz..... 15¢
 \$15.00..... 15¢
 Fox Reversible, Self-Fluter \$ doz \$24.00
 Chinese Laundry (N.E. Butt Co.) ¾¢, 15¢
 New England..... 15¢
 Mahony's Troy Pol. Irons..... 25¢
 Sensible..... 20¢20¢5¢
 National Self-Heating..... 30¢

Soldering—

Soldering Coppers..... \$ 23 @ 23¢
 Cover's Adjustable, list Jan. 1, 1886..... 55¢2¢

Irons, Pinking, per doz., 65¢.

Jack Screws—See Screws.

Jacks, Wagon.

Daisy..... 33½¢
 Victor..... 33½¢

Kettles—

Spun, Stamped.
 Brass, 7 to 17 in., \$ 24¢ 22¢
 Brass larger than 17 in., 26¢ 24¢
 Enameled and Tea—See Hollow-Ware.

Keys—

Lock Ass'n list Dec. 30, 1886..... 50¢10¢
 Eagle, Cabinet, &c..... 33½¢2¢
 Hotchkiss' Brass Blanks..... 40¢
 Hotchkiss, Copper and Tinned..... 40¢
 Hotchkiss' Pad, and Cab..... 35¢
 Ratchet Bed Keys..... \$ doz \$4.00, 15¢
 Wollensak Tinned..... 50¢10¢

Knife Sharpeners—See Sharpeners, Knife.

Knives.

Butcher, Shoe, &c—
 Wilson's Butcher Knife, list Oct. 1,
 1890..... 25¢
 Ames' Butcher Knives..... 25¢
 Foster Bros' Butcher, &c..... 40¢
 Nichols' Butcher Knives..... 40¢10¢
 Ames' Shoe Knives..... 20¢25¢
 Ames' Bread Knives, \$ doz \$1.50, 15¢20¢
 Moran's Shoe and Bread..... 20¢
 Hay and Straw..... See Hay Knives.
 Table and Pocket..... See Cutlery.
 Corn, Auburn Mfg. Co. Western Pat..... \$2.00
 Corn, Auburn Mfg. Co. Crescent..... \$3.50

Corns—

Bradley's..... 10¢
 Wadsworth's..... 25¢

Drawing—

Witherby..... }
 P. S. & W..... } .75 @ 75¢10¢
 New Haven..... }
 Merrill..... 60¢10¢60¢10¢5¢
 Douglas..... 75¢75¢5¢
 Watrous..... 15¢10¢25¢
 L. & J. White..... 20¢5¢
 Nichols' Shoe Knives..... 25¢33¢
 Adjustable Hand..... 35¢
 Wilkinson's Folding..... 25¢25¢5¢
 Hay and Straw—
 Lightning, Mfrs', price \$ doz \$18.00, 25¢
 But jobbers cut this price freely.
 often selling at \$8 @ \$8.50.
 Wadsworth's..... 40¢7¢40¢10¢
 Carter's Needle..... \$ doz \$11.00@11.50
 Heath's..... \$ doz \$13.00@13.50
 Auburn Hay, Corn, and Spear Point..... 40¢
 Auburn, Straw..... 40¢
 Nolin's Hay..... \$ doz \$7.00 @ \$8.00

Mining.

Am. (2d quality), \$ gr., 1 blade, \$7;
 2 blades, \$12; 3 blades, \$18..... net
 Lotthrop's..... 20¢10¢
 Smith's, \$ doz, Single, \$2.00; Double, \$3
 Knapp & Cowles..... 50¢10¢40¢
 Buffalo Adjustable..... \$ doz \$3.00, 25¢
 Buffalo Double Adj'table, \$ doz \$3.00, 25¢

Knobs—

Door Mineral..... 60¢65¢
 Door Por. Jap'd..... 70¢75¢
 Door Por. Nickel..... \$2.00@2.25
 Door Por. Plated, Nickel..... \$2.00@2.25
 Drawer, Porcelain..... 60¢10¢10¢10¢
 Hematite Door Knobs..... 40¢10¢50¢
 Yale & Towne Wood, list Dec. 1885..... 40¢
 Furniture Plain..... 75¢ gro 10¢, 10¢
 Furniture, Wood Screws..... 25¢10¢
 Base, Rubber Tip..... 70¢10¢5¢
 Picture, Jap'd..... 60¢10¢10¢
 Picture, Sargent's..... 70¢10¢
 Picture, Hematite..... 35¢5¢
 Shutter, Porcelain..... 65¢10¢
 Carriage, Jap..... \$ gro 80¢, 60¢10¢
 Bardsley's Wood Door, Shutter, &c..... 40¢

Ladles.

Melting, Sargent's..... 55¢10¢
 Melting, Reading..... 35¢10¢
 Melting, Monroe's Pat..... \$ doz \$4.00, 40¢
 Melting, P. S. & W..... 35¢10¢40¢
 Melting, Warner's..... 80¢

Lanterns—

Tubular—
 Plain with Guards, \$ doz..... \$4.00@4.25
 Lift Wire, with Guards..... \$4.50@4.75
 Square Plain, with Guards..... \$4.00@4.25
 Sq. Lift Wire, with Guards..... \$4.25@4.50
 with Guards, 25¢ doz less.
 Police, Small, \$6.00; Medium, \$7.25;
 Large, \$9.75..... 20¢25¢

Lawn Mowers—See Mowers, Lawn.

Lenders, Cattle.

Humason, Beckley & Co.'s..... 70¢
 Houghton's..... 60¢10¢
 Hotchkiss..... 30¢
 Peck, Stow & W. Co..... 60¢10¢

Lemon Squeezers—See Squeezers, Lemon.

Lifters, Transom.

Willersak's:
 Class 3 and 4, Bronzed Iron..... 50¢
 Class 3 and 4, Bronze Metal..... 25¢
 Class 3 and 4, Brass..... 35¢
 Skylight Lifters..... 75¢
 Crown, Eagle and Shield..... 50¢
 Reiter's, list Sept. 1, 1890..... 50¢10¢10¢2¢
 Bronzed Iron Rods..... 50¢10¢10¢2¢
 Brass, Lead Bronze or Nickel Plate..... 30¢

Excelsior..... 50¢10¢5¢
 Shaw's..... 50¢10¢
 Payson's:
 Universal..... 60¢
 Solid Grip..... 60¢
 Imperial..... 50¢10¢

Lines—

Cotton and Linen Fish, Draper's..... 50¢
 Draper's Chalk..... 60¢
 Draper's Mason's Linen, 84 ft., No. 1,
 \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4,
 \$2.75; No. 5, \$3.25..... 25¢
 Cotton Chalk..... 50¢
 Samson, Cotton, No. 4, \$2; No. 4½, \$2.50;
 10¢
 Silver Lake, Braided, No. 0, \$6.00; No. 1,
 \$6.50; No. 2, \$7.00; No. 3, \$7.50;
 No. 4, \$8.00; No. 5, \$8.50..... 25¢
 Mason's Linen No. 5½, \$1.50; No. 4,
 \$2.00; No. 4½, \$2.50..... 40¢
 Mason's Colored Cotton..... 40¢
 Wire Clothes..... 18 70 20
 100 ft..... \$4.00 \$3.50 \$3.00
 Ventilator Cord, Samson, Braided,
 White or Drab Cotton, \$ doz \$7.50, 30¢

Locks, &c.—

Cabinet—
 Eagle, Gaylord Par..... list March '84, rev
 ker and Corbin..... Jan. 1, '85, 33½¢4¢
 Delta, Nos. 36 to 39..... 40¢
 Delta, Nos. 51 to 63..... 40¢10¢
 Delta, Nos. 86 to 90..... 30¢
 Stoddard Lock Co..... 80¢33½¢
 "Champion" Night Latches..... 40¢
 Barnes Mfg. Co..... 40¢40¢10¢
 Eagle and Corbin Trunk..... 25¢2¢
 "Champion" Cab. and Combin..... 33½¢
 Yale..... net prices
 Rome..... 25¢

Door Locks—See Locks, &c.

R. & E. Mfg. Co., list Mar. 20,
 1889..... 65¢10¢70¢
 Mallory, Wheeler & Co., list
 July, '88..... lower net
 Sargent & Co., list Aug. 1, '88
 Reading Hardware Co., list
 Feb. 2, '88..... often
 made.
 Brittan, Graham & Mathes, list Jan.,
 1890..... 60¢10¢10¢
 Perkins' Burglar Proof..... 60¢25¢
 Plate..... 33½¢2¢
 Barnes Mfg. Co..... 40¢40¢10¢
 Yale..... net prices
 Delta Flat Key..... 30¢
 L. & C. Round Key Latches..... 30¢10¢
 L. & C. Flat Key Latches..... 30¢10¢
 Homer's Night Latches..... 15¢
 Shephardson or U. S..... 35¢
 Seed's N. Y. Hap Lock..... 35¢

Padlocks.

List Dec. 23, '84..... 75¢75¢10¢
 Brittan, Graham & Mathes..... 75¢10¢
 Yale Lock Mfg. Co.'s..... net prices
 Eagle..... 25¢2¢
 Eureka, Eagle Lock Co..... 40¢2¢
 Rome's, Nos. 0 to 91..... 30¢
 Rome's Scandinavian, &c., Nos. 100 to
 505..... 50¢5¢15¢
 A. E. Delta..... 40¢
 Champion Padlocks..... 40¢
 Hotchkiss..... 30¢
 Star..... 45¢
 Horseshoe..... \$ doz \$9, 40¢40¢10¢
 Barnes Mfg. Co..... 40¢40¢10¢
 Nock's..... 30¢
 Brown's Pat..... 25¢
 Scandinavian..... 30¢60¢10¢
 E. T. Frain's Key and Padlock..... 90¢10¢
 Nos. 119, 120, 130 and 140..... 90¢10¢
 Other Nos..... 65¢
 Ames Sword Co. up to No. 150..... 40¢
 Ames Sword Co. above No. 150..... 40¢
 Slaymaker Barry & Co..... 45¢5¢
 No. 31 line..... 60¢5¢
 No. 21 line..... 75¢5¢

Sash, &c.

Clark's, No. 1, \$10; No. 2, \$8 \$ gr..... 33½¢
 Ferguson's..... 33½¢
 Morris and Triumph, list Aug. 16, 1886..... 60¢2¢
 Victor..... 60¢10¢2¢
 Walker's..... 10¢
 Attwell Mfg. Co..... 25¢33½¢
 Reading..... 60¢10¢60¢10¢10¢
 Hammond's Window Springs..... 40¢
 Common Sense, Jap'd, Cop'd and
 Br'ed..... \$ gr \$4.00
 Common Sense, Nickel Plated..... \$ gr \$10.00

Universal.

Kempshall's Gravity..... 30¢
 Kempshall's Model..... 60¢60¢10¢
 Corbin's Daisy, list Feb. 15, 1886..... 70¢
 Payson's Perfect..... 60¢60¢10¢
 Hugunin's Sash Balances..... 25¢5¢2¢
 Hugunin's New Sash Locks..... 25¢5¢2¢
 Stoddard "Practical"..... 10¢
 Ives' Patent..... 60¢10¢60¢10¢5¢
 Liesche's, Nos. 100 and 110, \$ gr \$2;
 105, \$10.00..... 20¢10¢
 Davis, Bronze, Barnes Mfg. Co..... 50¢
 Champion Safety, list March 1, 1888..... 55¢55¢5¢
 Security..... 70¢
 Buckeye..... \$ gr \$4.80

Lumber Tools—See Tools, Lumber

Lustre—

Four-ounce Bottles..... \$ doz, \$1.75; \$
 gross..... \$17.00

Machines.

Boring—
 Without
 Augers. Upright, Angular.
 Douglas..... \$5.50 \$6.75..... 50¢
 Snell's, Rice's Pat. 5.50 6.75 40¢10¢11¢
 Jennings..... 5.50 6.75 45¢45¢11¢
 Other Machines..... 2.50 2.75..... 10¢
 Phillips' Patent
 with Augers 7.00 7.50.....
 Fluting.
 Knox, 4½-inch Rolls..... \$3.25 each } 35¢
 Knox, 6-inch Rolls..... \$3.00 each }
 Eagle, 3¼-inch Roll, \$2.15..... 35¢
 Eagle, 5½-inch Roll, \$2.85..... 35¢
 Crown, 4½ in., \$3.50; 6 in., \$4.00; 8 in.,
 \$5.50 each.....
 Crown Jewel, 6 in..... \$3.50 each, 35¢
 American, 5 in., \$3.00; 6 in., \$3.40; 7 in.,
 \$4.50 each..... 35¢
 Domestic Fluter..... each, \$1.50
 Geneva Hand Fluter, White Metal..... \$ doz \$12, 25¢
 Crown Hand Fluter, Nos. 1, \$15.00; 1,
 \$12.50; 3, \$10.00..... 30¢
 Shephard Hand Fluter, No. 85 \$ doz
 15 80..... 40¢

Shepard Hand Fluter, No. 110 7 dos \$11.00.....40%
Shepard Hand Fluter, No. 98 7 dos \$5.00.....40%
Clark's Hand Fluter, 7 dos \$15.00.....35%
Combined Fluter and Sad Iron, 7 dos \$15.00.....30%
Buffalo.....7 dos \$10.00.....10%

Hoisting—
Moore's Hand Hoist, with Lock 20%
Brake.....20%
Moore's Differential Pulley Block.....40%
Energy Mfg. Co.'s.....25%

Mallets.
Hickory.....20%
Lignumvitae.....20%
B. & L. Block Co., Hickory & L. V. 30%
Mattocks, Regular list.....60%
Measures—
Standard Fiberware, No. 1, peck, 7 dozen, \$4; 1/2 peck, \$3.50.

Meat Cutters—See Cutters, Meat.

Mills.
Coffee—
Box and Side, List Jan. 1, 1888.....60%
American, Enterprise Mfg. Co. 20%
The Swift, Lane Bros.....20%

Mining Knives—See Knives, Mining.

Molasses Gates—See Gates, Molasses.

Money Drawers—See Drawers, Money.

Mowers, Lawn.
Leading makers.....60%
Other makers.....60%
Pennsylvania.....60%
Continental.....60%
New Model.....60%
New Quaker City.....60%
Great American.....60%

Muzzles—
Safety.....7 dos \$3.00, 25%

Nails.
Cut and Wire. See Trade Report.

Wire Nails, Papered.
Association list, July 15, '89, 75%
Tack Mfrs' list.....60%
Wire Nails, Standard Penny.
Card June 1, '89, base.....\$2.70 @ \$2.75

House—See Trade Report.

Nos. 6 7 8 9 10
Ausable.....25% 25% 25% 24% 23%
Clinton, Fin. 17% 16% 15% 14% 13%
Essex.....25% 25% 24% 23% 22%

Lyra.....10% 17% 16% 15% 14%
Snowden.....10% 17% 16% 15% 14%
Putnam.....25% 21% 20% 19% 18%

Vulcan.....25% 21% 20% 19% 18%
Northwestern.....25% 21% 20% 19% 18%

Globe.....25% 21% 20% 19% 18%
Boston.....25% 21% 20% 19% 18%

A. C.....25% 23% 22% 21% 20%
C. B.-K.....25% 23% 22% 21% 20%

Maud S.....25% 23% 22% 21% 20%
Champlain.....25% 23% 22% 21% 20%

New Haven.....25% 23% 22% 21% 20%
Saranac.....25% 23% 22% 21% 20%

Champion.....25% 23% 22% 21% 20%
Capewell.....25% 23% 22% 21% 20%

Star.....25% 23% 22% 21% 20%
Anchor.....25% 23% 22% 21% 20%

Western.....25% 23% 22% 21% 20%
Empire Ironed.....25% 23% 22% 21% 20%

Picture—
Brass Head, Sargent's list.....50%
Brass Head, Combination list.....50%
Porcelain Head, Sargent's list.....50%
Porcelain Head, Combination list.....50%

Nail Pullers—See Pullers, Nail.

Nail Sets—See Sets, Nail.

Nut Crackers—See Crackers, Nut.

Nuts—
Nuts, off list Dec. 18, 1889: Square, Hex, Hot Pressed.....54% 6.00%
Cold Punched.....5.00% 4.90%
In lots less than 100 lb., add 1/4%
boxes, add 1% to list.

Oakum—
Government.....7 7 7 7 7
U. S. Navy.....7 7 7 7 7
Navy.....7 7 7 7 7

Oilers—
Zinc and Tin.....65%
Brass and Copper.....65%
Malleable, Hammers, Improved, No. 1, \$3.00; No. 2, \$4.00; No. 3, \$4.40 7 dos 10%
Malleable, Hammers, Old Pattern, same list.....40%
Prior's Pat. or "Paragon" Zinc.....60%
Prior's Pat. or "Paragon" Brass.....50%
Olmstead's Tin and Zinc.....50%
Olmstead's Brass and Copper.....50%
Broughton's Zinc.....60%
Broughton's Brass.....60%
Gem P. D. & Co.....60%
Steel, Draper and Williams.....50%

Openers, Can.
Messinger's Comet.....7 dos \$3.00, 25%
American.....7 dos \$3.00, 25%
Duplex.....7 dos \$3.00, 25%
Lyman's.....7 dos \$3.00, 25%
No. 4 French.....7 dos \$2.25, 55%
No. 5, Iron Handle.....7 gr \$6.00, 45%
Eureka.....7 dos \$2.50, 10%
Sardine Scissors.....7 dos \$2.75, 35%
Star.....7 dos \$2.75, 35%
Sprague, No. 1, \$2.00; No. 2, \$2.50; No. 3, \$2.50
Eccleston, No. 1, \$2.50; No. 2, \$1.50.....40%

World's Best, 7 gross, No. 1, \$12.00; No. 2, \$24.00; No. 3, \$36.00.....50%
Universal, 7 dos \$3.00.....45%
Domestic, 7 dos \$2.50.....45%
Champion 7 dos \$3.00.....45%

Packing, Steam—
Rubber—
Standard.....60%
Extra.....60%
N. Y. B. & P. Co., Standard.....40%
N. Y. B. & P. Co., Empire.....60%
N. Y. B. & P. Co., Salamander.....60%

Jenkins' Standard, 7 dos \$4.00, 25%
Miscellaneous—
American Packing.....10%
Russia Packing.....10%
Italian Packing.....10%
Cotton Packing.....10%
Jute.....10%

Padlocks—See Locks.

Pails.
Galvanized Iron—
Quarts 10 12 14
Hill's Light Weight, 7 dos \$2.75 3.00 3.25
Hill's Heavy Weight, 7 dos 3.00 3.25 3.75
Helwig's.....2.75 3.00 3.25
sidney Shepard & Co.....2.35 2.55 3.00
Iron Clad.....2.50 2.75 3.00
Fire Buckets.....2.75 3.25 3.50
Buckets, see Well Buckets.

Endurated Fibre Ware—25%
Star Pails, 12 qt, milk, 14 qt 7 dos \$2.00
Fire, Stable and Milk, 14 qt 7 dos \$7.80

Standard Fibre Ware—
Plain. Dec'd
Water Pails, 12 qt, per dos.....\$4.00 \$4.50
Dairy Pails, 14 qt, per dos.....4.50 5.00
Fire Pails, No. 1, 12 qt, per dos.....4.50 5.00
Fire Pails, No. 3, 14 qt, per dos.....5.00 5.50
Sugar Pails.....6.00 6.50
Horse Pails.....5.00 5.50
Buggy Pails.....4.00 4.50
Slop Jars (bal. trap).....8.00 9.00
Chamber Pails, 14 qt.....6.50 7.50

Pans.
Dripping.
Small tins.....7 dos \$0.4%
Large tins.....7 dos \$0.5%
Silver & Co. (Covered).....40%

Fry—
Standard List:
No. 1.....0 1 2 3 4
7 dos \$3.00 \$3.75 \$4.25 \$4.75 \$5.25
No. 2.....5 6 7 8 9
7 dos \$6.00 \$7.00 \$8.00 \$9.00 \$10.00
Polished, regular goods.....70%
Acme Fry Pans.....60%

Paper and Cloth—
Sand and Emery—
List April 19, 1888.....50%
Sibley's Emery and Crocus Cloth.....30%

Parers.
Apple.....7 dos \$4.75
Baldwin.....7 dos 5.25
Bonanza.....each 5.00
Champion.....7 dos 7.25
Daisy.....7 dos 4.00
Dandy.....each 7.50
Eureka, 1888.....each 10.00
Family Bay State.....7 dos 12.00
Favorite.....7 dos 5.00
Gem.....7 dos 5.25
Gold Medal.....7 dos 4.00
Ideal.....7 dos 4.00
Improved Bay State.....7 dos 27.00 @ 30.00
Little Star.....7 dos 4.50
Monarch.....7 dos 13.50
New Lightning.....7 dos 5.50
Orion.....7 dos 4.00
Penn.....7 dos 4.00
Perfection.....7 dos 4.00
Pomona.....7 dos 6.00
Rocking Table.....7 dos 4.50
Turntable.....7 dos 4.50
Victor.....7 dos 13.50
Waverly.....7 dos 4.00
White Mountain.....7 dos 4.25
72.....7 dos 4.25
78.....7 dos 4.25

Potato.
White Mountain.....7 dos \$4.50
Antrim Combination.....7 dos \$5.50
Hoosier.....7 dos \$13.50
Saragosa.....7 dos \$5.50

Pencil—
Faber's Carpenters'.....high list 50%
Faber's Round Gilt.....7 gr \$5.25
Dixon's Lead.....7 gr \$4.50
Dixon's Lumber.....7 gr \$6.75
Dixon's Carpenters'.....40%

Picks—
Railroad or Adse Eye, 5 to 6, \$12.00; 6 to 7, \$13.00.....60%
Picture Nails—See Nails, Picture.

Pinking Irons—See Irons, Pinking.

Pins.
Bow—
Humason, Beckley & Co.'s.....60%
Sargent & Co.'s.....\$17 and \$18.....60%
Peck, Stow & W. Co.....50%
Curtain—
Silvered Glass.....net
White Enamel.....net

Excuteon.
Iron, list Nov. 11, 1885.....50%
Brass.....60%

Pipe, Wrought Iron—
List September 18, 1889.
1 1/2 and under, Plain.....47%
1 1/2 and under, Galvanized.....47%
1 1/2 and over, Plain.....60%
1 1/2 and over, Galvanized.....47%
Boiler Tubes, Iron.
1 1/2 and under.....45%
2 to 4 inch.....50%
4-inch and larger.....52%

Planes and Plane Irons—
Wood Planes—
Molding.....40%
Sash, First Quality.....55%
Sash, Second Quality.....60%
Bailey's (Stanley R. & L. Co.).....40%

Iron Planes—
Bailey's (Stanley R. & L. Co.).....40%
Miscellaneous Planes (Stanley R. & L. Co.).....20%
Victor Planes (Stanley R. & L. Co.).....20%

Steer's Iron Planes.
Meriton Wal. Iron Co.'s.....40%
Davis's Iron Planes.....40%
Birmingham Plane Co.....50%
Gage Tool Co.'s Self-Setting.....20%
Chaplin's Iron Planes.....40%
Sargent's Iron Planes.....40%
Standard Tool Co.....50%

Plane Irons—
Butcher's.....\$5.00 @ \$5.25 to 2
Buck Bros.....30%
Auburn "Thistle".....35%
Sandsky.....25%
S. & L. J. White.....25%

Plates.
Felloe.....7 dos \$4 @ 6%

Pliers and Nippers—
Button's Patent.....50%
Hall's No. 2, 5 in., \$13.50; No. 4, 7 in. \$21.00 7 dos.....20%
Humason & Beckley Mfg. Co.....50%
Gas Pliers, Custar's Nickel Plated.....60%
Eureka Pliers and Nippers.....40%
Russell's Parallel.....25%
P. S. & W. Cast Steel.....50%
P. S. & W. Tinnars' Cutting Nippers.....50%
Carew's Pat. Wire Cutters.....20%
Morrell's Parallel, 7 dos, \$12.00.....30%
Cronk's 8 in., \$15.00; 10 in. \$21.00.....40%

Plumbs and Levels—
Regular List.....70%
Daviston's.....50%
Pook's.....50%
Davis Iron Levels.....30%
Davis' Inclinoimeters.....10%

Ponchers.
Egg.
Buffalo Steam Egg Poachers, 7 dos, No. 1, \$6.00; No. 2, \$9.00.....25%
Silver & Co., 6-Ring, 7 dos \$4; 3-Ring \$2

Pokes, Animal—
Bishop's I. X. L.....7 dos \$6.00
Bishop's O. K.....7 dos \$5.25
Bishop's Pioneer.....7 dos \$3.75
Bishop's American.....7 dos \$2.75
Eagle, Double Stale.....7 dos \$5.75
Eagle, Single Stale.....7 dos \$3.75
Buckeye, Single Stale.....7 dos \$2.75

Police Goods.
R. I. Tool Co., Handcuffs, \$15.00 7 dos 10%
R. I. Tool Co., Leg Irons, \$25.00 7 dos 10%
Tower's.....25%
Daley's Improved Handcuffs, 2 Hands, Polished.....\$45.00, Nickel, \$57.00, 3 Hands, Polished, \$72.00; Nickel, \$84.00.....25%
J. P. Lovell's Police Goods.....25%

Polish, Metal.
Prestoline.....30%
Prestoline Paste.....30%
Gaston's Silver Compound.....30%

Polish, Stove.
Joseph Dixon's.....7 gr \$6.00, 10%
Gold Medal.....7 gr \$4.50, 10%
Mirror.....7 gr \$6.00, 25%
Lustro.....7 gr \$4.75
Ruby.....7 gr \$3.75
Rising Sun, 5 gr lots.....7 gr \$5.50
Dixon's Plumbago.....7 gr \$2
Boynston's Noon Day, 7 gr.....13.00
Parker's Stove Enamel.....7 gr \$2.00
Yates' Liquid, 2 3 5 10 gal.....\$0.80 70 60 50
Yates Standard Paste Polish, 10-m cans, 7 dos \$12%
Jet Black.....7 gr \$3.50
Fireside.....7 gr \$3.50
Diamond O. K. Enamel.....7 gr \$19.00
Bonnell's Liquid Stove Polish, 7 gr \$9.00
Bonnell's Paste Stove Polish, 7 gr \$6.00
Black Eagle Benzine Paste, 5 and 10 m cans.....12%
Black Jack Water Paste, 5 and 10 m cans.....12%
Nickel Plate Paste.....7 gr \$6.00

Poppers, Corn—
Round or Square, 1 qt.....7 gr \$10.00 @ 15.00
Round or Square, 1 1/2 qt.....7 gr \$15 @ 15.50
Round or Square, 3 qt.....7 gr \$18.50 @ 19.00

Post Hole and Tree Augers and Diggers—See Diggers, Post Hole, &c.

Potato Parers—See Parers, Potato.

Pots.
Glue—
Tinned.....40%
Enamel.....40%
Family, Howe's "Eureka".....40%
Family, L. F. C.'s "Handy".....50%

Presses.
Fruit and Jelly—
Enterprise Mfg. Co.....20%
Henis.....7 dos \$3.50
Shepard's Queen City.....40%
Silver & Co.....7 dos \$2.75

Praning Hooks and Shears—
See Shears.

Pullers.
Nail
Curtiss Hammer.....7 dos \$9.00
Giant, No. 1.....7 dos \$13.00, 10%
Giant, No. 2.....7 dos \$15.00, 10%
Pelican.....7 dos \$9.00, 25%

Pulleys—
Hot House, Awaiting, &c.....60%
Japanned Screw.....60%
Brass Screw.....60%
Japanned Slide.....60%
Japanned Clothes Line.....60%
Empire Sash Pulley.....55%
Moore's Sash, Anti-Friction.....50%
Hay Fork, Solid Eye, \$4.00; Swivel, \$4.50.....50%
Hay Fork, "Anti-Friction," 5 in. Solid, \$5.70.....50%
Hay Fork, "P" Common and Pat. Bushed.....20%
Hay Fork, Tarbox Pat. Iron.....20%
Hay Fork, Reed's Self-Lubricating.....20%
Shade Rack.....45%
Tackle Blocks.....See Blocks
Moore's Anti-Friction 5 in. Wheel, 7 dos \$12.00.....40%

Pumps—
Clinton, Best Makers.....60%
Pitcher Spout, Best Makers.....60%
Pitcher Spout, Cheaper Goods.....60%

Punches—
Saddlers' or Drive, good, 7 dos.....60%
Bemis & Call Co.'s Cast Steel Drive.....50%
Bemis & Call Co.'s Spring Steel Socket.....50%
Spring, good quality.....7 dos \$2.50 @ 2.60
Spring, Leach's Pat.....15%
Bemis & Call Co.'s Spring and Check.....40%
Solid Tinnars' P. S. & W. Co., 7 dos \$1.44, 55%
Tin's Hollow Punches P. S. & W. Co. 20%
Rice Hand Punches.....15%
Avery's Revolving.....40%
Avery's Saw-Set and Punch, See Saw Sets.

Rail—
Sliding Door, Wrt Brass, 7 dos \$35.....15%
Sliding Door, Bronzed Wrt Iron, 7 ft. 7%
Sliding Door, Iron, Painted, 7 foot 4, 40%
Barn Door, Light In.....2%
Per 100 feet.....\$2.00 2.50 3.10, 10%
B. D. for N. E. Hangers.....Small. Med. Large.

Per 100 feet.....\$2.15 2.70 3.25, net
Terry's Steel Rail, 7 foot.....4%
Victor Track Rail, 7 foot.....50%
Carrier Steel Rail, 7 foot.....50%
Moore's Wrought Iron.....25%

Rakes—
Cast Steel, Association goods.....60%
Cast Steel, outside goods.....60%
Malleable.....70%
Gibbs Lawn Rake.....\$12.00, 50%
Canton Lawn Rake.....\$9.00, 50%
Ft. Madison Prize Bow Brace and Peck.....60%
Fort Madison Steel Tooth Lawn Rake, \$6.00.....25%

Razors—
J. R. Torrey Razor Co.....20%
Wostenholme and Butcher, \$10.00 to 2.....10%
Jordan's AAA1, list Nov. 1, 1889.....50%
Jordan's Old Faithful, list Nov. 1, 1890.....50%
Electric.....List net

Razor Straps—See Straps, Razor.

Rings and Ringers.
Brill Rings—
Union Nut Co.....55%
Sargent's.....60%
Hotchkiss' low list.....30%
Humason, Beckley & Co.'s.....70%
Peck, Stow & W. Co.'s.....50%
Ellich Hdw. Co., White Metal, low list.....50%

Hog—
Top of the Hill Ringers.....7 dos \$2.00
Top of the Hill Ringers.....7 dos \$1.25
Hill's Improved Ringers.....7 dos \$1.25
Hill's Old Style Ringers.....7 dos \$1.12%
Hill's Tongue.....7 dos \$3.00
Hill's Rings.....7 dos \$1.00
Perfect Rings.....7 dos \$1.00 @ 1.20
Perfect Ringers.....7 dos \$2.15 @ 2.25
Blair's Hog Ringers.....7 dos \$2.10
Blair's Hog Ringers.....7 dos \$2.10
Champion Ringers.....7 dos \$2.25
Champion Rings, Double.....7 dos \$2.25
Brown's Ringers.....7 dos \$2.00
Brown's Rings.....7 dos \$1.25 @ 1.30

Rivets and Burrs—
Iron, list Nov. 17, '87.....40%
Copper.....50%
Coppered Iron, Bettina Brand.....40%

Rivet Sets—See Sets.

Rods.
Stair, Brass.....25%
Stair, Black Walnut.....7 dos 40%

Rollers.
Barn Door, Sargent's list.....60%
Acme Moore's Anti-Friction.....55%
Union Barn Door Roller.....70%

Rope—
Manufacturers' prices:
Manila.....1/4 in. and larger 7 dos \$14 @
Manila.....1/4 in. 7 dos \$14 @
Manila.....1/2 and 5-16 in. 7 dos \$15 @
Manila Tarred Rope.....7 dos \$13 @
Manila, Hay Rope.....7 dos \$14 @
Sisal.....1/4 inch and larger 7 dos \$9 @
Sisal.....1/4 in. 7 dos \$9 @
Sisal.....1/2 and 5-16 in. 7 dos \$10 @
Sisal, Hay Rope.....7 dos \$9 @
Sisal, Tarred Rope.....7 dos \$9 @
Sisal, Medium Lathe Yarn.....7 dos \$8 @
New Zealand.....1/4 in. and larger 7 dos \$14 @
New Zealand.....1/4 inch, 7 dos \$14 @
New Zealand.....1/2 and 5-16 in. 7 dos \$14 @
New Zealand, Tarred Rope.....7 dos \$14 @
Cotton Rope.....7 dos \$15 @
Jute Rope.....7 dos \$14 @

Wire—
List May 1, 1888.....33%
Iron.....40%
Cast Steel.....40%

Rules—
Boxwood.....30%
Ivory.....60%
Starratt's Rules and Straight Edges, Steel.....25%

Sad Irons—See Irons, Sad.

Sand and Emery Paper and Cloth—See Paper and Cloth, Sand and Emery.

Sash Cord—See Cord, Sash.

Sash Locks—See Locks, Sash.

Sash Weights—See Weights, Sash.

Sausage Stuffers or Fillers—
See Stuffers or Fillers, Sausage.

Saws.
Diston's Circular.....45%
Diston's Cross Cuts.....45%
Diston's Hand.....20%
Woodrough & Co. Parlin.....25%
Hand, Panel and Rip.....25%
Narrow Champion Cross Cuts with Handles, 7 foot.....20%
Champion Thin Back Cross Cuts, 7 foot.....25%
Champion Extra Thin Back Cross Cuts, 7 foot.....31%
One Man Champion Cross Cuts, 7 foot.....40%
Wheeler, Madden & Clemson Mfg. Co. Hand, Panel and Rip.....30%
Narrow Champion Cross Cuts with Handles, 7 foot.....20%
Champion Thin Back Cross Cuts, 7 foot.....25%
Champion Extra Thin Back Cross Cuts, 7 foot.....31%
One Man Champion Cross Cuts, 7 ft. 40%

Atkins' Circular Shingle and Heading
Atkins' Silver Steel Diamond X Cuts
Atkins' Special Steel Dexter X Cuts
Atkins' Special Steel Diamond X Cuts
Atkins' Champion and Electric Tooth
Atkins' Hollow Back X Cuts
Atkins' Mulay, Mill and Drag
Atkins' One-Man Saw, with handles
Peace Circular and Mill
Peace Hand Panel and Rip
Peace Cross Cuts
Richardson's Circular and Mill
Richardson's X Cuts
Richardson's Hand, &c.

Hack Saws—

Griffin's, complete
Griffin's Hack Saw, Blades
Star Hack Saws and Blades
Eureka and Crescent

Scroll—

Lester, complete
Rogers, complete
Barnes' Builders' and Cabinet Makers
Barnes' Scroll Saw Blades

Saw Frames—See Frames, Saw.

Saw Sets—See Sets, Saw.

Saw Tools—See Tools, Saw.

Scales—

Hatch, Counter, No. 171, good quality
Hatch, Tea, No. 161
Union Platform, Plain
Union Platform, Striped
Chattillon's Grocers' Trip Scales
Chattillon's Eureka
Chattillon's Favorite
Family, Turnbills
Riehle Bros.' Platform

Scale Beams—See Beams, Scale

Scissors, Fluting

Scrapers—

Adjustable Box Scraper (S. R. & L. Co.)
Box, 1 Handle
Box, 2 Handle
Defiance Box and Ship
Ship, Common
Ship, R. I. Tool Co.

Screen Window and Door Frames—See Frames.

Screw Drivers—See Drivers, Screw.

Screws.

Bench and Hand—

Bench, Iron
Bench, Wood, Beech
Bench, Wood, Hickory
Hand, Wood
Lag, Blunt Point, list Jan. 1, 1890
Coach and Lag, Gimlet Point, list Jan. 1, 1890
Bed
Hand Rail, S. R. & L. Co.
Hand Rail, H. & B. Mfg. Co.
Hand Rail, Am. Screw Co.
Jack Screws, Millers Falls list
Jack Screws, P. S. & W.
Jack Screws, Sargent
Jack Screws, Stearns

Cork—

Humason & Beckley Mfg. Co.
Williamson's
Howe Bros. & Hulbert

Machine—

Flat Head, Iron
Round Head, Iron

Wood—

List March 1, 1890
Flat Head Iron
Round Head Iron
Flat Head Brass
Round Head Brass
Flat Head Bronze
Round Head Bronze
Rogers' Drive Screws

Scroll Saws—See Saws, Scroll.

Scythe Snaths—See Snaths, Scythe.

Sets.

Axi and Tool.

Alken's Sets, Axi and Tools
Fray's Adj. Tool Hds., Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100
Miller's Falls Adj. Tool Hds.
Henry's Combination Haft
Stanley's Excelsior
No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50
Nail
Square
Round
Buck Bros.
Cannon's Diamond Point

Nail—

Regular list
Stillman's Genuine
Stillman's Imita.
Common Lever
Morrell's No. 1
Leach's
Nash's

Rivet.

Regular list

Saw—

Stillman's Genuine
Stillman's Imita.
Common Lever
Morrell's No. 1
Leach's
Nash's

Hammer, Hotchkiss
Hammer, Bemis & Call Co.'s new Pat.
Bemis & Call Co.'s Lever and Spring
Bemis & Call Co.'s Plate
Bemis & Call Co.'s Cross Cut
Alken's Genuine
Alken's Imitation
Hart's Pat. Lever
Disston's Star
Leopold
Atkin's Lever
Atkin's Criterion
Croissant (Keller), No. 1
Avery's Saw Set and Punch
Chieftain H. R. Co.'s Superior
Sharpener, Knife
Parkin's
Appelwood Handles
Rosewood or Cocobolo
Shaves, Spoke
Iron
Wood
Bailey's (Stanley R. & L. Co.)
Stearns
Cincinnati
Shears
American (Cast) Iron
Barnard's Lamp Trimmers
Timmer's
Seymour's List
Heinrich's, List, Dec. 1881
Heinrich's Tailor's Shears
First quality C. S. Trimmers
Second quality C. S. Trimmers
Acme Cast Shears
Diamond Cast Shears
Clipper
Victor Cast Shears
Howe Bros. & Hulbert, Solid Forged
Steel
Chicago Drop Forge & F. Co., Solid
Steel Forged
Clausen Shear Co., Japaned
Clausen Shear Co., Nickel, same list
Electric
Pruning Shears and Hooks
Disston's Combined Pruning Hook and Saw
Disston's Pruning Hook
E. S. Lee & Co.'s Pruning Tools
Pruning Shears, Henry's Pat.
Henry's Pruning Shears
Wheeler, M. & C. Co.'s Combination
Dunlap's Saw and Chisel
J. Mallinson & Co., No. 1
P. S. & W. Co.
Timmer's, &c.
Shears and Snips (P. S. & W.)
Snips, J. Mallinson & Co.
Sheaves
Sliding Door
M. W. Co., list July, 1888
Corbin's list
Patent Roller
Patent Roller, Hardfield
Russell's Anti-Friction, list Dec. 1885
Moore's Anti-Friction
Sliding Shutter
R. & E. list Dec. 18, 1885
Sargent's list
Reading list
Ship Tools
L. & I. J. White
Shoes, Horse, Mule, &c.
Horse
Burden's, Perkins', Phoenix, at factory
Mule
Add \$1 per keg to above prices.
Or, Wrought—
Ton lots
1000 lb. lots
500 lb. lots
Shot
(Eastern prices 2¢ off, cash, 5 days)
Drop, 5 bag, 25 lb.
Buck and Chilled, 25 lb. bag
Buck and Chilled, 5 lb. bag
Shovels and Spades
Ames' Shovels, Spades, &c., list Nov. 1, 1885
NOTE—Jobbers frequently give 5¢ 7½¢ extra on above
Griffith's Black Iron
Griffith's C. S.
Griffith's Solid C. S. R. R. Goods
Old Colony (Sanford Fork & Tool Co.)
St. Louis Shovel Co.
Hussey, Binns & Co.
Hubbard & Co.
Lehigh Mfg. Co.
Payne Pettibone & Son, list January, 1886
Remington's (Lowman's) Pat.
Rowland's, Black Iron
Rowland's Steel
Shovels and Tongs
Iron Head
Brass Head
Sieves
Mann's Tin Rim
Buffalo Metallic, S. S. & Co.
Shaker (Barlier's Pat.) Flour Sifters
Electric
A. & W. Sifters
Hunter's
Smith's Adjustable Sifters

Smith's Adjustable Milk Strainer
Smith's Adjustable T. & C. Strainer
Staves, Wooden Rim—
Mesh 18, Nested, 80¢
Mesh 20, Nested, 95¢
Mesh 24, Nested, \$1.15
Skels, Thimble—
Western list
Columbus Wrt. Steel, Special net price
Coldbrookdale Iron Co.
Utica P. S. T. Skels
Utica Turned and Fitted
Slates—
School, by case
Snaps, Harness, &c.—
Anchor (T. & S. Mfg. Co.)
Fitch's (Bristol)
Hotchkiss
Sargent's Patent Guarded
German, new list
Covert, New Pat.
Covert, New R. E.
Covert Spring
Snaths, Scythe
List
Soldering Irons—See Irons, Soldering.
Spittoons, Cuspidors, &c.
Standard Fiberware—
Cuspidors, 8½-inch, No. 5, \$8;
Spittoons, Daisy, 8-inch, No. 1, \$4; 10 and 11 inch, \$6.
Spoke Shaves—See Shaves, Spoke.
Spoke Trimmers—See Trimmers, Spoke.
Spoons and Forks—
Tinned Iron—
Basting, Cen. Stamp Co.'s list
Solid Table and Tea Cen. Stamp Co.'s list
Buffalo S. S. & Co.
Silver-Plated—(4 mos. or 5¢ cash 30 days)
Meriden Brit. Co., Rogers
C. Rogers & Bros.
Rogers & Bros.
Reed & Barton
Wm. Rogers Mfg. Co.
Simpson, Hall, Miller & Co.
Roimes & Edwards Silver Co.
L. Boardman & Son
Miscellaneous
Holmes & Edwards Silver Co.
No. 87 Mexican Silver
No. 30 Silver Metal
No. 24 German Silver
No. 50 Nickel Silver
No. 40 Nickel Silver
Wm. Rogers Mfg. Co.
Rogers' Silver Metal
188 Rogers' German Silver
225 Rogers' Nickel Silver
German Silver
German Silver, Hall & Eiton
Nickel Silver
Britannia
Boardman's Nickel Silver
Boardman's Britannia spoons, case lots
Springs, Door.
Torrey's Rod, regular size
Gray's, 7 ft.
Bee Rod
Warner's
Gem (Coll), list April 19, 1886
Star (Coll), list April 19, 1886
Victor (Coll)
Champion (Coll)
Philadelphia, 5 in.
Cowell's
Rubber, complete
Hercules
Shaw Door Check and Spring
Elliptic, Concord, Platform and Half
The Boston
Cliff's Bolster Springs
Squares—
Steel and Iron
Nickel-Plated
Try Square and T Bevels
Disston's Try Square and T Bevels
Winterbottom's Try and Miter
Starrett's Micrometer Caliper Squares
Avery's Fluted Bevel Squares
Avery's Bevel Protractor
Squeezers—
Fodder—
Blair's
Blair's "Climax"
Lemon—
Porcelain Lined, No. 1
Wood, No. 2
Wood, Common
Dunlap's Improved
Sammis
Jennings' Star
The Boston
Dean's
Little Giant
Hotchkiss Straight Flash
Silver & Co., Glass
Standard Fiber Ware—See Ware, Standard Fiber.
Staples—
Blind—
Barbed, 1/4 in. and larger
Barbed, 1/4 in.

Fence Staples, Galvanized, Same price as Brd Wire
Fence Staples, Plain, See Trl. Rep.
Steelyards
Stocks and Dies
Blacksmith's
Waterford Goods
Butterfield's Goods
Lightning Screw Plate
Reece's New Screw Plates
Reversible Ratchet
Gardner
Stops, Bench.
Morrell's
Hotchkiss
Weston's
McGill's
Cincinnati
Stone—
Hindustan No. 1, 3; Axe, 3 1/2; Slips No. 1, 4 1/2
Sand Stone
Washita Stone, Extra
Washita Stone, No. 1
Washita Stone, No. 2
Washita Slips, No. 1, Extra
Washita Slips, No. 1
Arkansas Stone, No. 1, 4 to 6 in
Arkansas Stone, No. 1, 6 to 9 in
Turkey Oil Stone, 4 to 8 in
Lake Superior, Chase
Lake Superior Slips, Chase
Seneca Stone, Red Paper Brand
Seneca Stone, High Rounds
Seneca Stone, Small Whets
Stove Polish—See Polish, Stove.
Stretchers, Carpet.
Cast Steel, Polished
Cast Iron, Steel Points
Socket
Jullard's
Strops, Razor—
Genuine Emerson
Imitation
Torrey's
Rogers' Belt and Com.
Lamont Combination
Jordan's Pat. Padded, list Nov. 1, 1890
Electric
Stuffers or Fillers, Sausage—
Miles' "Challenge"
Perry
Draw Cut No. 4, each
Enterprise Mfg. Co.
Silver
Sweepers, Carpet.
Bissell No. 5
Bissell No. 7 New Drop Pan
Bissell, Grand
Grand Rapids
Crown Jewel, No. 1
Magie
Jewel
Improved Parlor Queen
Nickel
Janned
Excelior
Garland
Parlor Queen
Housewife's Delight
Queen, with band
King
Weed, Improved
Hub
Cog-Wheel
Conqueror
Easy
Monarch
Goshen
Tacks, Brads, &c.—
List Oct. 19, 1889, Standard Weights.
Carpet Tacks—
American Iron, Blued
Am'can Iron, Tin'd or Cop'd
Steel, Plain or Bright
Steel, Tinned or Coppered
Swedes Iron, Blued
Swedes Iron, Tinned or Cop'd
American Iron Cut Tacks
Swedes Ir. Uphol'sr's Tacks, Blued
Swedes Iron Upholsterers' Tacks, Tinned
Gimp and Lace Tacks, Blued
Gimp and Lace Tacks, Tinned
Swedes Iron Basket or Trimmers' Tacks
Miners' Tacks
Bill-Posters' or Railroad Tacks
Bill-Posters' or Railroad Tacks, Tinned
Copper Tacks
Copper Finish, & Trunk Nails
Cigar Box Nails
Zinc Glaziers' Points
Picture-Frame Points
Looking-Glass Tacks
Brush Tacks
Tin-Capped Trunk Nails
Finishing Nails
Trunk and Clout Nails, Black and Tinned
Common and Patent Brads
Hungarian Nails
Basket and Chair Nails
Leathered Carpet Tacks
Miscellaneous—
Double-Pointed, 120 count
Wire Carpet Nail
Plymouth Rock Steel Carpet Tacks

Wire Brads & Nails, see Nails, Wire.
Steel-Wire Brads, R. & E. Mfg. Co.'s
list.....50¢10¢

Tapes, Measuring—
American.....40¢10¢5¢
Spring.....40¢
Chesterman's, Regular list.....25¢30¢

Thermometers—
Tin Case.....80¢80¢10¢

Thimble Skelns—See Skelns.

Ties, Bale—Steel

Standard Wire, list.....50¢10¢5¢

Timbers' Shears, &c.—See Shears,

Timers', &c.

Tinware—

Stamped, Japanned and Pieced, list

Jan. 20 1887.....70¢10¢70¢10¢5¢

Tire Benders, Upsetters, &c.—

See Benders and Upsetters, Tire.

Tools.

Coopers—

Bradley's.....20¢

Barton's.....20¢20¢5¢

L. & J. White.....20¢5¢

Albertson Mfg. Co.....20¢

Beatty's.....30¢30¢5¢

Sandusky Tool Co.....30¢30¢5¢

Shaver, Cincinnati Tool Co.....20¢

Lumber.

Ring Peavies, "Blue Line".....\$20.00

Ring Peavies, Common.....\$18.00

Steel Socket Peavies.....\$21.00

Mail, Iron Socket Peavies.....\$19.00

Cant Hooks, "Blue Line".....\$16.00

Cant Hooks, Common Finish.....\$14.00

Cant Hooks, Mail, Socket Clasp, "Blue

Line" Finish.....\$16.00

Cant Hooks, Mail, Socket Clasp, Com-

mon Finish.....\$14.50

Cant Hooks, Clip Clasp, "Blue Line"

Finish.....\$14.00

Cant Hooks, Clip Clasp, Common Fin-

ish.....\$12.00

Hand Spikes.....\$15.00; 8 ft.,

\$30.00

Pike Poles, Pike & Hook, \$ doz., 12 ft.,

\$11.50; 14 ft., \$12.50; 16 ft., \$14.50;

18 ft., \$17.50; 20 ft., \$21.50

Pike Poles, Pike only, \$ doz., 12 ft.,

\$10.00; 14 ft., \$11.00; 16 ft., \$13.00; 18

ft., \$16.00; 20 ft., \$20.00.

Pike Poles, not ironed, \$ doz., 12 ft.,

\$8.00; 14 ft., \$9.00; 16 ft., \$9.00; 18

ft., \$12.00; 20 ft., \$16.00.

Settling Poles, \$ doz., 12 ft., \$14.00; 14

ft., \$15.00; 16 ft., \$17.00.

Swamp Hooks.....\$ doz \$18.00

Sate.

Atkins' Perfection.....\$ doz \$12.00

Atkins' Excelsior.....\$ doz \$6.00

Atkins' Giant.....\$ doz \$4.00

Tobacco Cutters—See Cutters, To-

bacco.

Transom Lifters—See Lifters,

Transom.

Traps—

Game—

Newhouse's.....40¢40¢5¢

Oneida Pattern.....70¢10¢

Game, Blake's Patent.....40¢10¢5¢

Mouse and Rat—

Mouse Wood Choker, \$ dosholes, 11¢12¢

Mouse, Round Wire.....\$ doz \$1.50, 10¢

Mouse, Cage Wire.....\$ doz \$2.50, 10¢

Mouse, Catch-em-alive.....\$ doz \$2.50 15¢

Mouse, Bonanza.....\$ doz \$0.90 \$1.25

Mouse, Delusion.....\$ doz \$1.00 \$1.25

Rat, Decoy.....\$ gr \$10.00, 10¢

Ideal.....\$ gr \$10.00

Cyclone.....\$ gr \$5.25

Hotchkiss Metallic Mouse, 5-hole traps,

\$ doz., 90¢; in full cases, \$ doz.....75¢

Hotchkiss Imp. Rat Killer.....\$ gro \$18.50

Hotchkiss New Rat Killer.....\$ gro \$18.50

Schuyler's Rat Killer.....\$ gro \$18.00

Triers—

Butter and cheese.....25¢

Trimmers, Spoke.

Bonney's.....\$ doz \$10.00, 50¢

Stearns'.....20¢10¢

Ives', No. 1, \$15.00; No. 2, \$12.00 \$ doz.

55¢10¢

Douglas'.....\$ doz \$9.00, 20¢

Cincinnati.....25¢

Trowels—

Lothrop's Brick and Plastering.....20¢10¢35¢

Reed's Brick and Plastering.....15¢

Diston's Br'k and Plastering.....25¢

Peace's Plastering.....25¢

Clement & Maynard's.....25¢

Rose's Brick.....15¢20¢

Bradley's Brick.....25¢

Worrall's Brick and Plastering.....20¢

Garden.....70¢

Trucks, Warehouse, &c.—

B. & L. Block Co.'s list, '82.....40¢

Tubes, Boiler—

See Pipe.

Twine—

Flax Twine.....BC. B.

No. 9, 1/4 and 1/2 Balls.....25¢ 34¢

No. 12, 1/4 and 1/2 Balls.....25¢ 32¢

No. 18, 1/4 and 1/2 Balls.....25¢ 32¢

No. 24, 1/4 and 1/2 Balls.....25¢ 32¢

No. 36, 1/4 and 1/2 Balls.....25¢ 31¢

No. 284, Matras, 1/4 and 1/2 Balls.....55¢

Chalk Line, Cotton, 1/4 Balls.....25¢

Mason Line, Linen, 1/4 Balls.....55¢

2-Ply Hemp, 1/4 and 1/2 Balls (Spring

Twine).....15¢

3-Ply Hemp, 1 B Balls.....10¢10¢

2-Ply Hemp, 1/4 B Balls.....10¢10¢

Cotton Wrapping, 5 Balls to 1.....15¢

2, 3, 4 and 5-Ply Jute, 1/4 B Balls.....10¢

Wool.....6¢6¢

Paper.....15¢15¢

Cotton Mops, 6, 9, 12 and 15 B to do.....15¢

Vises—

Solid Box.....50¢10¢50¢10¢5¢

Parallel.....15¢10¢

Fisher & Norris Double Screw.....15¢10¢

Stephens'.....25¢30¢

Parker's.....20¢25¢

Wilson's.....55¢

Howard's.....40¢

Bonney's.....40¢10¢

Miller Falls.....40¢10¢

Trenton.....40¢10¢

Merrill's.....15¢20¢

Sargent's.....60¢10¢10¢

Backus and Union.....40¢

Double Screw Leg.....15¢10¢

Freitas.....40¢25¢

Simpson's Adjustable.....40¢

Moore's.....20¢

Saw Vises—

Bonney's, Nos. 2 & 3, \$15.00.....40¢10¢

Stearns'.....35¢10¢35¢10¢10¢

Stearns' Silent Saw Vises.....35¢10¢

Sargent's.....60¢10¢

Hopkins.....\$ doz \$17.50, 10¢

Reading.....40¢10¢

Wentworth.....20¢10¢

Miscellaneous.

Combination Hand Vises.....\$ gr \$42.00

Still Hand Vises.....30¢

Bauer's Pipe Vises.....10¢

Cincinnati.....25¢10¢

Enterprise Pipe Vises, each.....\$3.00

Wagon Boxes—See Boxes, Wagon.

Washer Cutters—See Cutters

Washer.

Wagon Jacks—See Jacks, Wagon.

Ware, Hollow, Enameled, &c.

Cast Iron, Hollow—

Stove Hollow Ware—

Ground.....55¢5¢60¢5¢

Unground.....65¢10¢65¢10¢5¢

White Enameled Ware—

Maslin Kettles.....60¢10¢5¢

Boilers and Saucepans.....40¢

Rusted Boilers and Saucepans.....40¢

Rustless Hollow Ware.....50¢50¢5¢

Gray Enameled Ware—

Stove.....50¢

Maslin Kettles.....60¢10¢10¢

Boilers and Saucepans.....40¢5¢

Enameled—

Agate and Granite Ware, list Jan. 1,

1889.....33¢10¢

Ironclad Enameled Ware.....dis 33¢10¢

Kettles—

Galvanized Tea-Kettles—

Inch.....6 7 8 9

Each.....55¢ 60¢ 65¢ 75¢

Standard Fiber—

Per Dozen.

Plain, Dec'd.....\$2.00

Wash-Basins, 10 1/2 in.....\$2.25

Wash-Basins, 12 in.....2.75

Keelers, 11 1/2 in.....4.00

Cuspidors.....8.00

Spittoons, "Daisy," 8 in.....4.50

Peck Measures.....4.00

Half-peck Measures.....3.50

See also Pails.

Indurated Fiber—25¢

Spittoons, No. 2, \$ doz.....\$9.00

Basins, Ringed, \$ doz., No. 2, \$4.80;

No. 3.....\$4.20

Washbas, Nested, Nos. 0, 1, 3 and 5 (4

pieces), \$ nest.....\$7.50

Keelers, Nested, Nos. 1, 2, 3 and 4 (4

pieces), \$ nest.....\$3.70

Butter Bowls, 15, 17 and 19-inch (3

pieces), \$ nest.....\$2.25

Liquid Measures, pt., qt., 2 qt. and fun-

nel (4 pieces) \$ set.....\$3.00

Dry Meas., 1, 2, 3 and 16 qt. 15

pieces), \$ set.....\$3.00

See also Pails.

Silver Plated, Hollow—

4 mo. or 5 1/2 cash in 30 days.

Reed & Barton.....40¢5¢

Merriden Britannia Co.....40¢5¢

Simpson, Hall, Miller & Co.....40¢5¢

Rogers & Brother.....40¢5¢5¢

Hartford Silver Plate Co.....40¢5¢5¢

William Rogers Mfg. Co.....40¢5¢5¢

Washers—

Size.....1/4 5/16 3/8 1/2 5/8 3/4 1

Washers.....6 1/2 8 1/2 10 12 14 16

In lots less than 200 B, \$ B, add 1/4¢, 5-8

boxes 1¢ to list.

Wedges—

Iron.....\$ 3 1/2

Steel.....\$ 4 1/2

Weights, Sash—

Solid Eyes.....\$ ton \$18¢\$19

Well Buckets, Galvanized—See

Buckets, Well, Galvanized.

Wheels, Well.

8 in., \$2.25; 10 in., \$2.70; 12 in., \$3.25

Wire and Wire Goods—

Iron—

Market.

Br. & Ann., Nos. 0 to 18.....72¢

Cop'd, Nos. 0 to 18.....70¢

Galv., Nos. 0 to 18.....62¢

Tin'd, Tinned list Nos. 0 to 18.....63¢

Stons.

Br. and Ann'd, Nos. 18 to 18.....72¢

Bright and Ann'd, Nos. 19 to 26.....75¢

Br. and Ann'd, Nos. 27 to 36.....77¢

Tinned.

Tinned Broom Wire, 18 to 21, \$ B.....54¢

Galvanized Fence, Nos. 8 and 9.....65¢

Annealed Fence, Nos. 8 and 9.....75¢

Annealed Grade, Nos. 10 to 14.....75¢

Brass, list Jan. 18, 1884.....25¢

</

